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Message from the Editor-in-Chief

Dear Readers,

I am happy to inform you that the Turkish Online Journal of Educational Technology (TOJET) has been published third issue in 2011. This issue covered the selected papers from IETC-2011 (International Educational Technology Conference).
When people see the word ''technology'' or ''technique'', they automatically think of machines. If we look at the American Dictionary, it is defined as:

1. a technical language,
2. a) applied science
   b) a scientific method of achieving a practical purpose,
3. the totality of the means employed to provide objects necessary for human sustenance and comfort.

A related term, technique, is further clarified as:
1. the manner in which technical details are treated or basic physical movements are used; also the ability to treat such details or use such movements,
2. a) a body of technical methods and
   b) a method of accomplishing a desired aim.

These two definitions note that technology or technique refer not only to hardware but software and much more. In other words, technology is also not a collection of machines and devices, but a way of acting. In addition, technology refers to modernity. In other words, technology offers people more opportunities to upgrade their all kinds of life style.

One of these opportunities has been used by educators. Technology affects education system and gives more opportunities to teachers to improve the quality of learning and teaching activities in education. When technology is used in education, we talk about educational technology. The main goal of educational technology is to encourage students to learn more. When students are encouraged, they keep the knowledge into their long term memory.

TOJET is interested in various researches in educational technology. These researches can help teachers to find out how educational technology can motivate and help students to put the knowledge to their long term memory. Therefore, I am pleased to publish this issue which different papers from various fields are shared with professionals.

We have four guest editors for this issue. These are Prof. Dr. Ferhan Odabaşı, Prof. Dr. Arif Altun, Assoc. Prof. Dr. Eralp Altun, and Assoc. Prof. Dr. Eric Zhi-Feng Liu.
TOJET thanks and appreciate guest editors and the editorial board who have acted as reviewers for one or more submissions of this issue for their valuable contributions.

TOJET organized IETC 2011 (International Educational Technology Conference – 2011 www.iet-c.net) at Istanbul University between May, 25-27 2011. TOJET will organize IETC-2012 in Beijing, China. IETC series is an international educational activity for academics, teachers and educators. This conference is now a well known educational technology event. It promotes the development and dissemination of theoretical knowledge, conceptual research, and professional knowledge through conference activities. Its focus is to create and disseminate knowledge about the use of instructional technology for learning and teaching in education.

Call for Papers
TOJET invites article contributions. Submitted articles should be about all aspects of educational technology. The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJET.

July 01, 2011

Prof. Dr. Aytekin İŞMAN
Editor-in-Chief of TOJET

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A COMPARATIVE ANALYSIS OF CYBERBULLYING PERCEPTIONS OF PRESERVICE EDUCATORS: CANADA AND TURKEY

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ABSTRACT
Canadian preservice teachers (year one N= 180 & year two N= 241) in this survey study were compared to surveyed preservice educators in Turkey (N=163). Using a similar survey tool both Turkish and Canadian respondents agreed that cyberbullying is a problem in schools that affects students and teachers. Both nations agreed that children are affected by cyberbullying however a lack of confidence was found in the Canadian sample yet Turkish educators believed they could both identify and manage cyberbullying. Cyberbulling in comparison to other topics covered in the current teacher preparation program, was believed to be equally important. Preservice teachers in both countries believed they should use an anti-cyberbully infused curriculum which had activities and current resources. A school-wide approach, in combination with professional development coupled with counselling from community supports was perceived to be essential to deal with cyberbullying in each country. Parents and community members were believed to be essential as was the idea that various media sources should be used to reach the larger community. As a result of their university training both Turkish and Canadian respondents felt unprepared to deal with cyberbullying.
Keywords: cyberbullying, preservice teachers, bullying, comparative study, school policy

INTRODUCTION
Two decades of major research has unquestionably indicated that school bullying and violence is a problem for society worldwide (O'Moore, 2005, p. 11). Cyberbullying, a distinct mode of bullying, as defined herein is indeed a global issue as worldwide prevalence rates of bullying range from 10% of secondary students to 27% of middle school students which is quite consistent across countries (World Health Organization, 2002, p. 27). A recent United States summit focused on cyberbullying brought to light this realization:

> For all the promise of this summit, it is incumbent on everyone in this room and every educator and school leader to ask: What can we do to sustain that commitment to reduce bullying?... The answers to that basic question are many. But they start, and end, with the fact that the problem of bullying has been shrouded in myth and misunderstanding for far too many years. As educators, as state and local officials--and yes, absolutely at the federal level--we simply have not taken the problem of bullying seriously enough. Too often, bullying gets shrugged off. (Duncan, 2010, p. 23)

"Cyberbullying involves using communication technology to harass, intimidate, threaten, or otherwise harm others" (Hinduja & Patchin, 2010, p. 21). Cyberbullying has become a negative phenomenon that should be carefully dealt with since school children have methods for conducting cyber bullying such as mobile phone messages, instant messaging, chat rooms and e-mail (Kowalski & Limber, 2007), that are indeed covert. Technology has briskly outpaced policy development within the last five years and as a result we have new problems, dilemmas and issues that need attention, new legislation and refined laws. Communications via computers and mobile phones (texting & photography) continues to grow as technology usage grows pervasively for example, "as of September 2009, 93% of American teens between the ages of 12 and 17 went online, a number that has remained stable since November 2006" (Lenhart, Purcell, Smith & Zickuhr, 2009, p. 1).

Cyberbullying has been "occurring with increasing frequency, and the psychological effects may prove to be as devastating, if not more so, than traditional bullying" (Kowalski, Limber & Agatston, 2008, p.15). Cyber violence is a new yet common term as Hanewald (2008) pointed out:

> Cyber violence and its most prevalent sub-form of cyber bullying is a very recent phenomenon. There is little material that explores the complexities of cyber abuse from an educational perspective. The most abundant scholarly writings on the subject have been from the legal perspective (i.e. policing and regulating of cyber crimes, the prosecution of cyber criminals), the technological area (i.e. prevention and detection software) and the discipline of psychology (i.e. study of human relationship, counseling of victims) (p. 3).

This global issue needs to be managed and penalization for behaviour that may be characterized as cyber violence needs to be crafted and in place. The Government of Canada's national strategy on community safety and crime prevention was created in 1998 to support and assist victims including children, adults and minorities. At the community level in Canada local school Boards in concert with provincial Ministries of Education have published resource booklets on Cyberbullying to try to reach all Canadians. Still there is more to do to be proactive. In Canada, the province of Ontario introduced new legislation concerning cyberbullying as it is now an offence for which a student can be suspended or expelled from school. "Premier Dalton McGuinty said: whether you do it online by way of the latest technology or you're doing it in person or over the old fashioned telephone, it still causes pain and suffering" (CityNews, 2007, p.1). The Premier added:

> We'll be providing training to vice-principals and principals on how to apply discipline in a non-discriminatory manner, including considerations for anti-racism, cross-cultural differences and accommodating students with disabilities. We must ensure that there are strong consequences for inappropriate behaviour, as well as provide programs so students can earn their way back into the classroom and complete their education. (CityNews, 2007, p. 1)

Clearly stakeholders need to be knowledgeable; we need to seek out teachers in training and in service to alert teachers to the issue of cyberbullying globally and not just in Ontario or Canada. One way to alert teachers is to reach into training institutions to begin to examine their current understanding and perception of cyber bullying as an element of cyber violence. We can begin this process by asking preservice teachers to respond to issues via research efforts. Peering into data we can better gauge educators' perceptions, levels of awareness, capability and understanding of cyberbullying as a form of cyber violence.

BACKGROUND

Hinduja and Patchin (2009) defined cyberbullying as "wilful and repeated harm inflicted through the use of computers, cell phones, and other electronic devices" (p. 5). Williams and Guerra (2007) suggested bullying reaches its highest level during early adolescence as elementary students are less likely to use technology in negative ways, they are at ease with technology and imagine they are anonymous (p. 4). Those opting to use technology in a negative manner may elect to do so during adolescence since it is a time of peak and intense interpersonal and social tension hence the greater the likelihood to misuse technology (Li, 2007). Most youth have easy access to technology, are adept at using this medium and are often unsupervised when doing so (Hinduja & Patchin, 2007; Ybarra, Mitchell, Wolak, & Finkelhor, 2006) "Stu Auty, president of the Canadian Safe Schools Network, explained ... that many teens don't realize how mean and brutal their actions are when they post something negative on-line about another student or teacher" (CityNews, 2007, p.1). It is "proactive aggression that has no clear goal and is often displaced and hostile in intent" (Emmer, Everston, & Worsham, 2006, p. 6). In a review of literature concerning cyberbullying Hanewald (2008) reported:

> In the London based study ... the incidents of cyber bullied – showing that 22 % of children had been cyber bullied at least once – this was consistent with other findings in the UK and the US. However, it was discovered that almost 7 % of those students had experienced cyber bullying more frequently. Contrary to previous assumptions where cyber bullying happened exclusively outside school hours, it surfaced in this study that cyber bullying occurred both inside and outside of school although more cyber bullying still occurred outside school. (p. 6)

Bullying online is an invasive social problem in schools globally. In Canada, Kowalski (2005) looked at 3,700 grade six, seven and eight students finding cyberbullying affected over 650 or 18 % of the students and in eighth grade incidents peaked at 21 % or 750. (p.7). A Turkish researcher, Yilmaz (2010) suggested cyberbullying is a new phenomenon in Turkish schools ... [and that] Turkish preservice teachers hold a strong belief towards its seriousness in school" (p. 267). Hence the pressing need to investigate, to examine, and report future educators' perceptions.

Bullying: A Global Issue
Turkish researchers, Akbulut, Sahin, and Eristi (2010) found that "56 percent of participants experienced at least one instance of cyberbullying victimization" (p. 198), that involved such behaviour as impersonation of others, swearing, uninvited overtures via instant messaging, and email harassment. Within this Turkish context, "age, education level and Internet proficiency" (Akbulut et al. 2010, p. 198), were not correlated. Aricak (2009) discovered that cyberbullying was carried out by mostly males who were both anonomous and characterized by "hostility and psychoticism [which] predicted cyberbullying" (p. 183). Turkish researchers have also revealed how cyberbullying is universal, as it can happen to anyone, at anytime, and in any place, regardless of age, place of residence or technologic expertise, therefore, we can conclude that cyberbullying is a pervasive issue that can potentially impact all (Aricak, 2009; Aricak et al., 2008; Erdur-Baker & Kavşut, 2007). Researchers have also demonstrated that the location of Internet access factored into the probability of victimization as home users were less likely to be victims whereas public usage increased victimization and as usage increased so did the probability of victimization (Akbulut, Sahin, & Eristi, 2010, p. 198).

"The British National Children's Home (2005) survey on bullying discovered that 58 % of students have not told their parents or any other adult about their online experiences" (Hanewald, 2008, p. 11). The result, most school personnel are unaware of many bullying problems (Mishna, Scarcello, Pepler & Weiner, 2005). In one study it was found that the majority of the teachers stated that they did not know how to deal with indirect bullying (Mishna, Scarcello, Pepler & Weiner, 2005). We should point out that indirect bullying differs from "direct bullying [which] consists of teasing, taunting, threatening, hitting, and stealing. Indirect bullying can cause a student to be socially isolated through exclusion ... Boys typically engage in direct bullying methods, but girls who bully [use indirect modes] "(Manning & Butcher, 2007, p. 226). Indirect [proxy] bullying behaviours involve purposeful actions that lead to social exclusion or damage to a child's status or reputation in an attempt to get others not to socialize with the victim (Crick & Gropeter, 1995). These **indirect** or **proxy** behaviours can include online threats, insults, name calling, spreading rumours, writing hurtful messages, or encouraging others not to socialize with the victim (Rivers & Smith, 1994). Epstein and Kazmierczak (2006) caution:

> Because cyber bullying often begins on family computers and students' personal cell phones, parents must be vigilant with their monitoring efforts. Parental vigilance is paramount, because inappropriate text messages, e-mails, and postings on Web sites and in chat rooms usually do not occur on school property. Parents and teachers must talk with students about the dangers of cyberbullying, and take action immediately. (p. 44)

All caregivers, providers and educators must become aware of this global issue as we can all play a role. The Center for Safe and Responsible Internet Use suggested cyber bullying affects students globally as Australian and American children stay home from school because they feel threatened, and Scandinavian children are fearful of using their school locker rooms (Willard, 2005). Cyber bullying is particularly dangerous for students who are susceptible to depression and anxiety, and tragically caused the murder of a student in Japan (Marshall, 2005). O'Moore (2005) broadens the discussion explaining;

> Since the first European Seminar on School Bullying which was held in Stavanger, Norway in August 1997 ... , a wealth of statistics have emerged from many countries within and outside of Europe…and more recently from Northern Ireland…These statistics confirm that school bullying and violence is an international problem. (p. 1)

The need for a global response is required and past due. We need only look at the victims to sense the urgency of this matter.

Victims
Turkish research indicated that males were more likely to be victims (Akbulut et al. 2010; Aricak et al., 2008), and when school type is considered the "public school students were more likely to report being cyberbullies and cybervictims than private school students (Topçu, Erdur-Baker & Çapa-Aydin, 2008). We know that cyberbullying pervades cyberspace and can potentially reach anyone who is online; the more you are online the more likely you will become a victim at some point (Akbulut et al. 2010; Erdur-Baker & Kavşut, 2007). With increasing use the numbers continue to grow, as more and more children and teenagers commit suicide as a result of cyber violence (cyberbullying), and a new term has surfaced, 'Bullycide' as more deaths have been documented via media reports (Backus, 2009). To bring the point closer one victim confessed,

> I believe that cyberbullying hurts the person more psychologically; I don't mean that ordinary bullying does not do it but I think that the effect becomes more psycho-logical. You become more frightened if you e.g. get a sms [text message] that says: 'I will kill you'. (Slonje & Smith, 2008, p. 152)

An Ontario elementary student who now stays at home rather than attend school reported to Mandel (2010) that,

> It began with text messages telling her not to come back to school or she'd get beaten up... Then came the Facebook threats, including one that said if she came to a pre-teen dance in town, she'd be "Morgan 'Rest in Peace' Jones." Her mom says the principal told her to pull her kids out because retaliation is inevitable and he can't ensure their safety. (p.1)

The above case escalated from cyber violence (cyberbullying) to actual physical assaults and the administration and school could do little to prevent this. Researchers sampled 384 schools and discovered that 43 percent of Principals would survey and insert a bullying program (Smith, Cousins & Stewart, 2005). The regional municipality of Peel, an area in southern Ontario has developed the Peel Health Bullying Prevention Initiative, which has multiple lessons for every grade and is meant to be used with an entire school.

> The goal is to have every teacher address the issue of bullying by using the lesson plans with their class ... Consistency is achieved by having all students in the school learning the same lesson about bullying prevention at the same time. Each month every student in the school, from kindergarten to grade eight, will be hearing the same message about bullying. (Peel Public Health, 2010, p. 17)

Each educator (adult) must be aware and informed of bullying, cyberbullying and the larger issue of cyber violence. The knowledge can lead to useful observations in a school environment. However,

> Students do often report that teachers do not consistently intervene to stop bullying... Teachers' explanations for their apparent lack of intervention include uncertainty about how to respond, not having witnessed the incidents, and identification of mild bullying as typical childhood behaviour without serious ramifications ... Moreover, adults may have difficulty recognizing bullying behaviour because of the complex dynamics involved. (Mishna, Scarcello, Pepler, & Weiner, 2005, p. 6)

All bullying is serious and it is not a part of normal development. Hence the Ontario Ministry of Education announced;

> Ontario's elementary classrooms will be embracing some sweeping changes to their daily curriculum this school year… Students in grades 1 through 8 will be learning about active living and healthy eating choices, bullying, cyber stalking, substance abuse, body image and mental and emotional health under a provincial mandate seeing its first major overhaul since 1998. (Ottawa Sun, 2010, p. 1)

The new teachers hired this coming year will be in the centre of this changing curriculum therefore it would be useful to know their perceptions of cyberbullying as well as try to understanding the underlying attitudes towards this form of cyber violence.

Preservice

Patchin & Hinduja (2010) examined self-esteem and cyberbullying in students and concluded,

> Experience with cyberbullying, both as a victim and as an offender, was associated with significantly lower levels of self-esteem, even after controlling for demographic differences. As such, it is important for educators to make an effort to prevent and respond to all forms of bullying—whether it is manifested in fistfights on school campuses or through disparaging and threatening instant messages in cyberspace, because both directly or indirectly affect the climate of the school and the well-being of the youth involved. (p. 614)

Educators are most often in positions to sense behaviour issues since they invest large portions of their time working with students throughout the day, semester and year. They have an opportunity to reach out to students via their relationships and roles in education. If a situation requires attention, alteration or modification teachers are usually able to achieve this. On the other hand teacher training in preservice is a time of grounding and professional development and consequently, if we aim to support educators in their efforts to thwart cyberbullying we need to encourage preservice teachers as they will soon be directing, coaching and instructing the next generation.

Preservice education is a time of intense study of teaching, instruction, curricula, policy and administration (Ryan, 2009). Some suggest the training falls short as,

> preservice teachers entering their student teaching experiences frequently report feeling inadequately prepared to effectively manage a classroom. Preservice teachers complain that they receive little to no specific instruction in classroom management, yet when classroom management is incorporated into university teacher education undergraduate courses, it is often perceived as too theoretical or disconnected from the "real world" of classrooms. (Siebert, 2005, p. 1)

New educators have a great deal to attend to while performing within the practicum and having to be aware of the implications of cyber-violence and work toward its prevention seems unrealistic at this point. Siebert (2005) adds:

> Extensive research has revealed that preservice and inservice teachers' frequently identify their experiences in the field as moments when most of their learning about teaching occurred ... Additionally, preservice teachers often believe their university professors to be too far removed from or unaware of the realities of contemporary classrooms. Rather, "real" teachers are K-12 teachers, the teachers "in the trenches". Given this, embedding attention to classroom management issues in field-based experiences, such as student teaching, may be an optimal time to address preservice teachers' perceived needs in the area of classroom management. (p. 1)

Li (2006) found that "although a majority of the preservice teachers understand the significant effects of cyberbullying on children and are concerned about cyberbullying, they do not think it is a problem in our schools" (p. 5). The Alberta study concluded: "A vast majority of our preservice teachers do not feel confident in handling cyberbullying, ... they do not know either how to identify the problem, or how to manage it when it occurs" (p. 6). This study is one of only a few to be found in Canada as the research on cyberbullying is minimal in this country (Brown, Jackson, & Cassidy, 2006). These findings provided us with a rationale for our comparative analysis of cyberbullying perceptions in two distant regions.

Cyberbully outcomes: Canada (Ontario) year one

Both years within the Ontario studies used similar methods. Year one was completed during the 2008-2009 post-secondary (B.Ed.) school year where Kariuki and Ryan (2010) found,

> 71.7% were aware that cyberbullying is a problem in schools
> 88.9% agreed that children are affected by cyberbullying
> 78.9 were concerned about cyberbullying
> 92% would do something if cyberbullying occurred in school
> 33% felt confident that they would be able to identify cyberbullying
> 15% were confident about managing cyberbullying.
> 49% viewed cyberbullying as a topic, just as important as other topics covered in the teacher preparation program.
> 56% did not feel that the program had prepared them to manage cyberbullying (p. 14).

We compared our outcomes to the previous Alberta (Canada) data of Li in 2006 and discovered, a majority (88.9% in Ontario, 65.5% in Alberta) agreed that children were affected by cyberbullying. A majority (79%, in Ontario, 49.7% in Alberta) were concerned about cyberbullying, and only 32.8% in Ontario and 13.1% in Alberta felt confident that they would be able to identify cyberbullying. Further, only 15% in Ontario and 11.1% in Alberta were confident about managing cyberbullying. One finding contrary to the trend was that while a majority (71.7%) of the preservice teachers in the Ontario study were aware that cyberbullying was a problem in schools, a majority (45%) of the of the preservice teachers in the Alberta study were neutral in this regard. (Kariuki & Ryan, 2010)

Cyberbully outcomes: Canada (Ontario) year two

A snapshot of Year two completed during the 2009-2010 post-secondary (B.Ed.) school year surfaced as follows:

> 80% were aware that cyberbullying is a problem in schools
> 94% agreed that children are affected by cyberbullying
> 81% were concerned about cyberbullying
> 68% would do something if cyberbullying occurred in school

30% felt confident that they would be able to identify cyberbullying
23% were confident about managing cyberbullying.
47% viewed cyberbullying as a topic, just as important as other topics covered in the teacher preparation program.
27% did not feel that the program had prepared them to manage cyberbullying (Ryan & Kariuki, in press).

The many results are not fully noted above as they are reported hereafter, yet we used these preliminary findings to call out to educational stakeholders to elevate concern for cyber violence within the educational community globally via presentations and publishing.

The current comparative study considered these research questions:

1.To what extent does cyberbullying concern preservice teachers' in Ontario and Turkey and is it viewed as a problem which affects children?
2.Do respondent preservice teachers believe they can identify and manage cyberbullying in schools?
3.How do preservice teachers in Canada compare with the preservice teachers in Turkey?

METHOD

During a four year university education degree one hundred and sixty three preservice educators in Turkey (N=163), spread out over seven different state universities were surveyed using a modified version of Li's (2006) cyberbully survey. Yilmaz (2010) explained how the tool was translated into Turkish and then back to English to ensure accuracy (p. 266). The Turkish survey was delivered via web-based mode resulting in a sample of 163 male and female preservice educators.

In Canada two hundred and forty-one (241) preservice teachers (60% female-40% male approximately) enrolled in a post degree, one-year B.Ed., program within a teacher preparation institution in Ontario, Canada responded to a cyberbullying questionnaire. The questionnaire was administered by educators (instructors) who volunteered to participate after the final teaching practicum in March 2010. This was a second year the survey had been used and complemented an inquiry which surveyed 180 preservice educators. All preservice teachers enrolled and present on the day of the survey completed the face to face survey fully hence we can claim a 100% return rate with no surveys incomplete or inadmissible. We were sure that all participants could complete the survey as they had during year one and previously during the research of Li in 2006. Our study was a partial replication of an Alberta study (Li 2006). While some of the original items in the original questionnaire were adapted, the items that this paper focused on were not changed from the year one questionnaire. Permission to use and adapt the questionnaire was granted by the author, (Li, 2006) in 2007.

RESULTS

The following tables illustrate Ontario (Canadian) results in year one and two as well as data from the Turkish study. We summed a few categories to report as one (percentage) indicating low levels of concern and/or confidence, and strongly agree and agree were grouped to indicate high levels of concern and/or confidence. This was also the way the Turkish study undertook their analysis hence the ease of comparison. All percentages were rounded to the nearest whole number as follows.

Table 1: Personal perceptions of cyberbullying.

Statement	S. disagree or disagree (%) Year I	(%) Yr II	(%) Turkish	Neutral (%) Year I	(%) Yr II	(%) Turkish	S. agree or agree (%) Year I	(%) Yr II	(%) Turkish
1. Cyberbullying is a problem in schools	7	2	9	22	20	13	72	80	78
2. Children are affected by cyberbullying	4	2	7	7	4	7	89	94	86
3. I am concerned about cyberbullying	4	3	13.5	16	16	9	78	81	77
4. I feel confident in identifying cyberbullying	30	26	17	37	44	31	33	30	51.5
5. I am confident in managing cyberbullying	45	40	14	40	37	37	15	23	48.5

The above data led to the following observations.
Between 72 and 80% of Turkish and Canadian preservice educators were aware that cyberbullying was a problem in schools.

a) The Turkish and Canadian samples indicated (86 to 94%) strongly that children were affected by cyberbullying.
b) 77 to 81% of preservice participants were concerned about cyberbullying.
c) Turkish preservice teachers felt more (51%) confident than Ontario participants (30%) in their ability to identify cyberbullying.
d) Less than 50% of the respondents felt confident about managing cyberbullying.

Clearly preservice educators realize cyberbullying is a problem that affects children. Most respondents in both countries indicated they were concerned with cyberbullying and Turkish preservice educators felt more confident than the Ontario samples in identifying cyberbullying. Specifically, only a minority (Ontario), 31% in year 1, and 33% in year two felt confident they could identify cyberbullying whereas almost half of the Turkish sample (48.5%) thought they could identify cyberbullying. Ontario preservice teachers were less confident about managing cyberbullying than Turkish respondents.

Looking ahead to Table 2, statement 20 in the Canadian survey was the same as statement 13 on the Turkish survey that asked about the teacher preparation program they were about to graduate from. Between 50% and 60 % of preservice teachers, in Turkey and Ontario did not believe that the preservice education training program had prepared them to manage cyberbullying.

Table 2: Teacher preparation perceptions.

Statement # #20.Canada #13.Turkey	S. disagree or disagree (%) Year I	Yr II	(%) Turkish	Neutral Year I	Yr II	(%) Turkish	S. agree or agree (%) Year I	Yr II	(%) Turkish
My current teacher preparation program has been preparing me to manage cyberbullying	57	50	51.5	29	23	24	14	27	24.5

Within Table three Turkish and Ontario preservice teachers strongly agreed or agreed (90/91%) that instruction, policy and professional development should be directed by policy driven by cyberbullying information. Therefore, we suggested local Boards of Education (teacher employers) need to concentrate on cyberbullying as a priority. Also, our samples believed and indicated schools should use professional development (P. D.) days to train staff while developing and implementing a curriculum underpinned by cyberbullying resources to educate students. Our respondents further indicated, school administrators should organize school-wide activities to deal with cyberbullying and in both countries preservice teachers' believed school curricula and administration should be directed to both educate students and inform the wider community about cyberbullying.

Table 3: Instruction, policy and professional development.

Statement #Canada (#T) = Turkey	S. disagree or disagree (%)Year I	Yr II	(%) Turkish	Neutral (%) Year I	Yr II	(%) Turkish	S. agree or agree (%)Year I	Yr II	(%) T
#7.(6T)Schools should develop policies on cyberbullying	5	3	4	7	6	5.5	90	91	90
#8.(7T) Schools should use professional development days to train staff about cyberbullying	2	3	6	12	12	5.5	82	85	88
#9.(8T) Teachers should use a curriculum on cyberbullying to teach children	6	12	5.5	30	28	3	59	59	91

#10.(9T) Teachers should organize classroom activities to deal with cyberbullying	4	9	7	4	23	9	75	68	84
#11.(10T) School administrators should organize school-wide activities to deal with cyberbullying	3	8	9	14	17	10	79	75	81

In table four, response to statements indicated Turkish and Ontario participants believed committees should be formed in schools to look at the problem of cyberbullying. Parents should be involved, and cyberbullying should be part of school assemblies. Further, preservice teachers believed that schools should link with community resources to deal with cyberbullying, children should receive counselling to confront cyberbullying.

Table 4: School and community.

Statement # = Canada (#T) = Turkey	S. disagree or disagree (%)Year I	Yr II	(%) Turkey	Neutral (%) Year I	Yr II	(%) Turkey	Strongly agree or agree (%)Year I	Yr II	(%) (Turkey)
14.(11T) Schools should discuss cyberbullying with parents	2	4	7	6	7	8	90	90	85
18.(12T) Children should receive counselling to deal with cyberbullying	1	3	9	12	16	12	84	84	79

DISCUSSION

Initially we undertook this comparative analysis to explore and examine cyberbullying by asking; to what extent does cyberbullying concern preservice teachers' in Ontario and Turkey and is it viewed as a problem which affects children? Data collected suggested that over three-quarters of all samples were concerned about cyberbullying and viewed it as a problem for students in schools in turkey and Ontario. This was perhaps due to the recent increase in the number of computers, the increasing availability of the internet (Wi-Fi), and improved hand-held communications devices there are bound to present issues related to their (mis)usage. Instant messaging (texting) and image sharing (photo emailing) means that students can instantly distribute or publish these, 'moments in time' in a manner that many not only be novel but do so in an increasingly efficient manner. The generation now in elementary or secondary school have grown up with the internet and internet-based communication tools and more than ever before, they feel confident and demonstrate more violent behaviors even though they do not dare to say or do such things to someone face to face (Lenhart, Madden, & Hitlin, 2005). It is more than possible that a few images and messages are inappropriate, not approved, and possibly illegal. Hanewald (2008) suggests,

> Cyber violence and its most prevalent sub-form of cyber bullying is a very recent phenomenon. There is little material that explores the complexities of cyber abuse from an educational perspective. The most abundant scholarly writings on the subject have been from the legal perspective (i.e. policing and regulating of cyber crimes, the prosecution of cyber criminals), the technological area (i.e. prevention and detection software) and the discipline of psychology (i.e. study of human relationship, counselling of victims). (p. 3)

We knew cyber behaviour needed attention hence our work in this area was motivated by a second primary question which asked: Do respondent preservice teachers believe they can identify and manage cyberbullying in schools?

To identify symptoms one need be aware of the impact that technology may have on children and adolescents. Yilmaz (2010) summarized the findings succinctly suggesting,

> Cyberbullying affects students' lives in different ways and causes some problems including emotional distress, insecurity, anxiety, loneliness, frustration, anger, lower self-esteem, depression, and being suicidal (ABC News, 2007, Beran & Li, 2007, Breguet, 2007; Patchin & Hinduja, 2006; Ybarra, Mitchell, Wolak, & Finkelhor, 2006).

Over half (51.5%) of the Turkish respondents indicated they could identify cyberbullying yet less than half (48.5) indicated they could manage cyberbullying once identified. The Canadian (Ontario) samples were less confident, and in fact was mostly undecided or neutral on this item (between 37-44%) whereas they did not believe they could manage cyberbullying even if they could identify it. Globally, the findings were similar which led to this statement.

> In Japan, where these latter forms of bullying are most common, girls are more frequent bulliers ... but in Korea they also tend to be more susceptible to suicidal ideations … Further, the dynamics of bullying are taking on new proportions and no longer take place directly. Ortega-Ruiz and Mora-Merchán (2007) note that the advent of cyberbullying means that victims now have no 'safe space' into which they can retreat from bullying – among an 'online generation', bullying can take place '24/7' and without any spatial limitations. (Moore, Jones, & Broadbent, 2008, p. 7)

Due to the 24/7 reality and covert nature cyber activity it is difficult for educators to believe they can manage cyberbullying yet the symptoms of cyber violence may be sensed or noted more easily by educators due to their relationships with students developed over many hours and days of the school year. Li (2006) concluded that teacher preparation programs need to aggressively incorporate opportunities for preservice teachers to acquire the skills and knowledge needed to foster confidence in identifying and managing cyberbullying in schools.

Our third question asked: How do preservice teachers in Canada compare with preservice teachers in Turkey?

Our investigation revealed that most data (Table 1, 2, 3, 4) was similar to the Turkish data. On the first three items, both countries agreed (SA/A) that cyberbullying is a problem which affects children and that they were concerned. Indications on the next two items were disparate as only the Turkish preservice educators believed they could identify cyberbullying whereas The Canadian sample were neutral or uncertain as to their ability. Once identified Turkish respondents thought they could manage cyberbullying whereas the Canadian sample did not believe they could. On all of the remaining nine items both countries agreed. Respondents, for instance, believed school policies should be in place, as well as training for teachers and the curriculum should deal with cyberbullying. Similarly, the participants in each of the studies agreed that classroom activities and school-wide activities should be in place to deal with cyberbullying. Parents were believed to be as important as school counsellors. Unfortunately, both Turkish and Ontario samples believed their university teacher preparation program they were about to graduate from did not prepare them to for cyberbullying thus the desire to learn more in both countries about this growing issue.

CONCLUSIONS AND RECOMMENDATIONS

Participants in this study have indicated agreement with the statement: Cyberbullying is a problem in schools that affects students and teachers. Also, we concluded as did, Brown, Jackson, & Cassidy (2006) after reviewing many studies that, "at the school level, there is a need for acceptable-use policies that expand on online use and behaviour to include **both** school and home use" (p. 1). Even with policy in place the fact is that our Canadian samples did not believe they were confident identifying nor managing cyberbullying yet they would try to do something anyway. Turkish respondents however indicated the opposite as over half believed they could identify cyberbullying yet less than half believed they could manage it. The task to identify the covert indirect violence means they have to look at symptoms such as, low self-esteem, anxiety, anger, depression, school absenteeism, poor grades, an increased tendency to violate against others, [and] youth suicide (Willard, 2006). These conditions, behaviours, or states of mind are concealed, and largely unknown to the teacher unless there is a mechanism in place to support and encourage both disclosure and counselling. Perhaps a cyber (online) forwarding system could help, so victims could forward offending material to authorities in confidence.

Our data led us to conclude that there was overwhelming support for the development of school policies. As well,

> directions for policy development to address the diverse aspects of cyberbullying often suggest a holistic approach… holistic school policies stressing the values of care and kindness and restorative justice approaches are the most effective preventive tools in tackling cyberbullying. However, and consistent with the importance of localized context … each school must adopt its own policies and

> guidelines tailored to its own individual requirements and context. Further… policies must be in force on a continual basis in order for them to be effective, and some policies may need to extend beyond school boundaries, given the realities of students' use of the computer at home. (Brown, Jackson, & Cassidy 2006, p. 1)

Enforcement of the local policy may lead to legal challenges hence the call for professional development and training for teachers to utilize a curriculum infused with cyberbullying information is necessary. Classroom activities and school-wide activities should be in place to deal with cyberbullying as education is our best defence and tool. O`Moore (2005) provides a global view suggesting it "is evident worldwide, a global response is necessary that is both unified and co-ordinated. To achieve this requires a national strategy on the part of all member states to prevent the ill-effects of school bullying and violence" (p. 1). Parents were believed to be important as well as school counsellors. Unfortunately, both Turkish and Ontario samples believed their university teacher preparation programs they were about to graduate from were not preparing them for the challenge of cyber violence. In sum, we recommend that the following points be added as part of all school activities.

School-wide

1. Schools should develop policies on cyberbullying.
2. Schools should use professional development days to train staff about cyberbullying.
3. School administrators should organize school-wide activities to deal with cyberbullying.
4. Committees should be formed in schools to look at the problem of cyberbullying.
5. Schools should discuss cyberbullying with parents.
6. School assemblies should address cyberbullying
7. Schools should link with community resources to deal with cyberbullying
8. School resources should be used to help teachers deal with cyberbullying.

Community

9. TV and other media should discuss cyberbullying.
10. Children should receive counselling to deal with cyberbullying.

Classroom

11. Teachers should use a curricula cyberbullying to teach children.
12. Teachers should organize classroom activities to deal with cyberbullying.

LIMITATIONS

The general purposes of research can include knowledge production, understanding, and prediction. This study has focused on understanding the extent to which cyberbullying concerned preservice teachers' in Ontario and Turkey and the extent to which it was viewed as a problem which affected children. Also we hoped to determine if they can identify and manage cyberbullying in schools and how preservice teachers in Canada compare with the preservice teachers in Turkey. Using only a survey method in cyberbullying research is a limitation. Prospective studies should make use of qualitative methods to grasp the perceptions of cyberbullying.

We believe data sources were not as accurate nor complete as would be the case if face to face interviews were completed or if larger samples could be utilized. The Turkish translation of the English survey may have impaired meaning and the purity of the data, as it was via translation, which may not have been as tightly defined or structured as a result. Each county may have used somewhat different methodologies (time of day, month, year) and this may have distorted findings, results and conclusions admittedly. The fact that only one survey was used also limited findings and to assume that preservice candidates are similar in these two diverse countries was a source of potential weakness within the design.

Enhanced data display and further analysis may have yielded more information and focussed the research conclusions in a different way; however, the multiple researcher approach was made use of herein and the analysis of these data sources was undertaken as necessary. Generalizations were used in terms of language when addressing cyberbullying, victimization, and preservice yet each of the authors and eventual readers may understand these terms differently hence the meaning may be lost somewhat. Potential shortcomings in this research that are sources for bias include researcher pre-understanding of the issues, possible outcomes and grasp of the phenomena globally.

Future research is needed to continue to develop an understanding of cyberbullying. Future research should interview cyberbullies, cybervictims and bystanders if possible and enhanced data analysis and even meta-analyses of existing studies would prove useful we believe.

REFERENCES

Akbulut, Y., Sahin, Y. L., & Eristi, B. (2010). Cyberbullying victimization among Turkish online social utility members. *Journal of Educational Technology & Society, 13* (4), 192-201.

Aricak, O. T. (2009). Psychiatric symptomatology as a predictor of cyberbullying among university students. *Egitim Arastirmalari-Eurasian Journal of Educational Research, 34*, 167-184.

Aricak, T., Siyahhan, S., Uzunhasanoglu, A., Saribeyoglu, S., Ciplak, S., Yilmaz, N., & Memmedov, C. (2008). Cyberbullying among Turkish Adolescents. *Cyberpsychology & Behavior, 11* (3), 253-261.

Backus, M. S. (2009). OMG! Missing the teachable moment and undermining the future of the first amendment. *Case Western Reserve Law Review*, *60*(1), 153-204.

Brown, K., Jackson, M., & Cassidy, W. (2006). Cyberbullying: Developing policy to direct responses that are equitable and effective in addressing this special form of bullying. *Canadian Journal of Educational Administration and Policy*, 57. Retrieved from http://www.umanitoba.ca/publications/cjeap/articles/brown_jackson_cassidy.html

CityNews (2007, April 16). Cyberbullying law introduced in Ontario. Toronto: ON. Retrieved from http://www.citytv.com/toronto/citynews/life/family/article/16010--cyberbullying-law-introduced-in-ontario

Crick, N.R., & Gropeter, J.K. (1995). Relational aggression, gender, and social psychological adjustment. *Child Development,* 66, 710-722.

Crone, D. A., & Horner, R. H. (2003). *Building positive behaviour support systems in schools: Functional behavioral assessment*. New York, NY: Guildford Press.

Duncan, A. (2010, August). The myths about bullying. U.S. Department of Education. Anti-bullying Summit. Washington D.C. From http://www.ed.gov/news/speeches/myths-about-bullying-secretary-arne-duncans-remarks-bullying-prevention-summit

Emmer, E.T., Everston, C.M., & Worsham, M. E. (2006). *Classroom management for middle and high school teachers.* (7th ed.). Boston, MA: Pearson Allyn & Bacon.

Epstein, A., & Kazmierczak, J. (2006). Cyber Bullying: What teachers, social workers, and administrators should know. *Illinois Child Welfare, 3* (1-2), 41-51.

Erdur-Baker, Ö., & Kavsut, F. (2007). Cyber bullying: a new face of peer bullying. *Egitim Arastirmalari-Eurasian Journal of Educational Research, 27*, 31-42.

Espelage, D.L., & Swearer, S.M. (Eds.). (2004). *Bullying in American schools: A social-ecological perspective on prevention and intervention.* Mahweh, NJ: Lawrence Erlbaum Associates.

Hanewald, R. (2008). Confronting the pedagogical challenge of cyber safety. *Australian Journal of Teacher Education, 33* (3), 1-16.

Henderson, W.C., & McVay, G. C. (2010, July/August). Keep up with the times: Twittering the day away and potential legal pitfalls for employers. *Journal of the Association of Corporate Counsel: AccDocket,* 88-97.

Hinduja, S., & Patchin, J.W. (2007). Offline consequences of online victimization: School violence and delinquency. *Journal of School Violence, 6(3),* 89-112.

Hinduja, S., & Patchin, J.W. (2009). Bullying beyond the school yard: Prevention and responding to cyber bullying. Thousand Oaks, CA: Corwin Press.

Hinduja, S., & Patchin, J. W. (2010). Bullying, cyberbullying, and suicide. *Archives of Suicide Research, 14* (3).

Hutchinson, N. L. (2002). *Inclusion of exceptional learners in Canadian schools: A practical handbook for teachers.* Toronto, ON: Prentice Hall.

Kariuki, M., & Ryan, T.G. (2010). Preservice teachers' awareness of cyberbullying issues. *Review of Higher Education and Self-learning (RHESL).* 3 (1), 1-19. Intellectbase International Consortium. Retrieved from http://www.intellectbase.org/journals.php

Kowalski, R. (August, 2005). *Electronic bullying among school-aged children and youth*. Poster presented at the annual meeting of the American Psychological Association. Washington, DC.

Kowalski, R.M., & Limber, S. P. (2007). Electronic bullying among middle school students. *Journa of Adolescent Health, 41,* S22-S30.

Kowalski, R.M, Limber, S.P. & Agatston, P.W. (2008) *Cyber Bullying - Bullying in the Digital Age.* Oxford: Blackwell. students. *Journal of Adolescent Health, 41,* S22-S30.

Lenhart, A., Madden, M., & Hitlin, P. (2005). Teens and technology: Youth are leading the transition to a fully wired and mobile nation. Retrieved from http://www.pewinternet.org/Reports/2005/Teens-and-Technology.aspx

Lenhart, A., Purcell, K., Smith A., & Zickuhr, K. (2009). Social media and mobile internet use among teens and young adults. Pew Internet & American Life Project: An initiative of the Pew Research Center. Washington, D.C. Retrieved from www.pewresearch.org/millennials

Li, Q. (2007). New bottle but old wine: A research of cyber bullying in schools. *Computers in Human Behavior, 23,* 1777-1791.

Mandel, M. (2010, February 26). Bullies torment Ontario girl. CNews. Retrieved from http://cnews.canoe.ca/CNEWS/Canada/2010/02/26/13034436-qmi.html

Manning , M.L., & Bucher, K.I. (2007). *Classroom management: Models, applications, and cases* (2nd ed.) Columbus, OH: Pearson Merrill/Prentice Hall.

Marshall, M. (2005). New technology and girl power change face of bullying. *Education* (UK), 201, 1.

Mishna, F., Scarcello, I., Pepler, D., & Weiner, J. (2005). Teachers understanding of bullying. *Canadian Journal of Education, 28* (4), 718-738.

Moore, K., Jones, N., & Broadbent, E. (2008). *School Violence in OECD countries*. Learn Without Fear. Plan Limited, Chobham House, Christchurch Way, Woking, Surrey, UK. 1-22.

O'Connell, P., Pepler, D., & Craig, W. (1999). Peer involvement in bullying: Issues and challenges for intervention. *Journal of Adolescence, 22*, 437-452.

O'Moore, M. (2005) A Guiding Framework for Policy Approaches to School Bullying & Violence. Dublin: Trinity College. http://www.oecd.org/dataoecd/28/0/33866844.pdf.

O'Moore, M. (2000) Critical Issues for teacher training to counter bullying and victimisation in Ireland. *Aggressive Behaviour*, 26, 99 – 111.

Olweus Bullying Prevention Program (2003, September). Retrieved from http://www.clemson.edu/olweus/history.htm

Ottawa Sun (2010, August 09). Ottawa changes elementary curriculum. Ottawa: ON. Retrieved from http://www.ottawasun.com/news/ottawa/2010/08/09/14971241.html

Patchin, J. W., & Hinduja, S. (2010). Cyberbullying and self-esteem. *Journal of School Health*. *80* (12), 614-621.

Peel Public Health (2010). Working together to prevent bullying: Peel public health bullying prevention initiative lesson plans, 2007. Brampton, ON: Retrieved from http://www.peelregion.ca/health/bullying/downloads.htm

Rigby, K. (2004). Addressing bullying in schools: Theoretical perspectives and their implications. *School Psychology International, 25*(3), 287-300.

Rivers, L., & Smith, P.K. (1994). Types of bullying behavior and their correlates. *Aggressive Behavior, 220*, 359-368.

Ryan, T. G. (2009). An administrator's (mentors) guide to the beginning teacher's needs. *New Zealand Journal of Teachers' Work, 5* (2), 1-12.

Ryan, T.G., & Kariuki, M. (In press). A two year comparative analysis of cyberbullying perceptions of preservice educators.

Siebert, C.J. (2005). Promoting preservice teachers' success in classroom management by leveraging a local union's resources: A professional development school initiative. Education (Spring). Retrieved from http://findarticles.com/p/articles/mi_qa3673/is_3_125/ai_n29175554/

Slonje, R., & Smith, P. K. (2008). Cyberbullying: Another main type of bullying? *Scandinavian Journal of Psychology*, *49*(2), 147-154.

Smith, D., Cousins, B.J., & Stewart, R. (2005). Antibullying interventions in schools: Ingredients of effective programs. *Canadian Journal of Education, 28* (4), 739-762.

Topçu, Ç., Erdur-Baker, Ö., & Çapa-Aydin, Y. (2008). Examination of cyberbullying experiences among Turkish students from different school types. CyberPsychology & Behavior, 11 (6), 643-648

Trawick-Smith. (2006). *Early childhood development: A multicultural perspective.* Upper Saddle River, NJ: Pearson Education.

Willard, N. (2005). Cyberbullying guidance for school leaders*. Center for Safe and Responsible Internet Use*. http://www.cyberbully.org/documents

Willard, N. (2006). Flame retardant*. School Library Journal. 52*(4), 55-56.

Williams, K.R., & Guerra, N.G. (2007). Prevalence and predictors of Internet bullying. *Journal of Adolescent Health, 41,* S14-S21.

World Health Organisation. (2002). World report on violence and health, Geneva, Switzerland World Health Organisation. From http://whqlibdoc.who.int/hq/2002/9241545615.pdf

Ybarra, M. L., Mitchell, K. J., Wolak, J., and Finkelhor, D. (2006). Examining characteristics and associated distress related to Internet harassment: Youth Internet Safety Survey. *Pediatrics, 118*(4), 1169-1177.

Ybarra, M.L., Diener-West, M., & Leaf, P.J. (2007). Examining the overlap in Internet harassment and school bullying: Implications for school intervention. *Journal of Adolescent Health, 41,* S42-S50.

Yilmaz, H. (2010). An examination of preservice teachers' perceptions of cyberbullying. *Eurasia Journal of Mathematics, Science & Technology Education, 6*(4), 263-270

A STEP FOR EVALUATING CONSTRUCTIVIST APPROACH INTEGRATED ONLINE COURSES

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ABSTRACT
This research aims to reveal the validation of 86-items in order to develop a scale for evaluating constructivist approach integrated online courses in higher education practices. The main aim of this research process is to reveal a scale to further evaluate whether the online education practices in higher education have the notions of constructivist approach with constructed sub categories based on factor analysis. The Statistical Package for the Social Sciences (SPSS) was employed for the purpose of data entry, manipulation, and analysis. Firstly, the extended literature review and theory were considered to develop items about the online education practices. Then, the item pool was constructed in relation to the gap within the literature as it is a need to generate a scale for evaluating the online courses in higher education practices. Furthermore, items were selected from the pool and statistical analysis was done, then categories were set as constructivist online learning process, peer learning and evaluation, collaborative learning outcome, developing skills and online course design based on the supervision of two experts in the field. The scale will serve to evaluate online courses which practice constructivist approach within their design and system. Factor analysis of the items showed how this scale is acceptable, valid and reliable and how this research is significant to fill the gap in the literature as it can be repeated in further studies.
Keywords: Collaborative learning, constructivist approach, course design, online education, scale

INTRODUCTION

Online education practices become the fundamental part of the higher education practices to diffuse knowledge and learning opportunities as an alternative service as regards the leaner centred education (Austin, et al, 2010; Gazi A, Silman, Birol, 2008). Learners are the central of the learning and teaching process in respect to leaner centred education which relies on needs, expectations and the satisfaction of the students (Zapalska, Brozik, 2006). Contemporary education system leads alternative and different learning and teaching platforms to satisfy the needs and expectations of the learners who enrolled higher education programs with demanding no limitation of the education as a time, space and distance. In this respect, online education practices gain reputation that provides differentiation of the service in higher education for quality and propose effective learning environment concerning life long learners who wish to continue education (Wallace, 2002).

Regarding the life long learning philosophy, especially the adult learners have enthusiasm to continue learning process to attribute their personal and professional development. In this respect, online education practices have a great role to facilitate being part of the higher education programs and develop advanced knowledge and professional knowledge at the same time through numerous facilities (Stacey, Smith, Barty, 2004).

Online education practices in higher education can be exhibited with its organisational and pedagogical aspects to reveal the quality of the programs that learners enrol. In this respect, concerning organisational learning and its impact to the pedagogical implications of the online education practices together is inevitable (McPherson, Nunes, 2006). Significantly, the pedagogical aspects such as course design, learning process, tutor facilitation, gaining subject matter knowledge and developing skills are the critical success factors of the online education practices which it is highly demanding to be investigated in detail (Gazi A, 2009; McLukie, Topping, 2004; Tu, Corry, 2003).

Regarding the notions of constructivist approach in online pedagogy, learning environment needs to be authentic and has connection to real world experiences. In addition, learning platform should foster social negotiation and mediation (Aksal A, 2009; Tu, Corry, 2003). Significantly, learners' prior knowledge has to be taken into account and content of the course should be convenient to the learners. Further to this, assessment should cover the process not only the product (Luxton-Reilly, 2009). Moreover, tutors should serve as a facilitator. In addition to this, course content and the facilitation of the tutor need to encourage learners to gain multiple perspectives based on social interaction (Aksal A, 2010; Aksal A, 2009; Jonassen, 1991).

As the online practices have potential to diffuse learner centred education and the constructivist approach within its pedagogy, there is intensified need to implement principles of constructivist approach into course design, learning process and reveal tutor and faculty contributions for that implementation in order to achieve the outcome of gaining subject matter knowledge and developing skills for the learners (Gazi A, 2010; Gazi A, Aksal A, 2011). According to (Salmon, 2002), online course design as one of the critical success factor of online education is interactive and user-friendly to exhibit learning objectives, learning process and the outcome as learners expect to follow during the course. It needs to be plan and platform for shared recognition between groups (tutor, technical support, learners) who involved in social interaction in learning process (Mclukie, Topping, 2004). Further to this, constructivist based course design provides gaining socially constructed knowledge and developing particular skills such as team work, reflection and negotiation, etc (Austin, et al., 2010; Gazi A, 2009; Tu, Corry, 2003).

Moreover, constructivist based online learning process itself is another critical success factor as (Gazi A, Aksal A, 2011) highlighted in their researches. Arguments arise on constructivist online learning process as it fosters advanced knowledge and skills development through gaining multiple perspectives from others based on interaction and negotiation. In addition, various researches exhibited tutor and faculty contribution as imperative success factor of the online pedagogy. In this respect, researches pay attention that promoting collaborative, authentic learning environment needs effective competences of the tutors and support of the faculty with considering technical and organisational collaboration facilities (Jonassen, 1994; Macdonald, 2003).

Although researchers argued the organisational and pedagogical development of the online education practices as regards the constructivist approach, they stay partial by not being empirical and not signifying the evaluation tool for the effectiveness of the practices (Gazi A, 2010). In addition to this, various arguments arise on how courses need to be designed and how collaborative learning platform run into practice in respect to constructivist based online learning process. However, limited researches were conducted to evaluate the effectiveness of the practices and almost all researches considered to propose recommendations instead of revealing the satisfaction of the learners (Bernard, Rubalcava, 2000; Murphy, Cifuentes, 2001; Owens, Bozeman, 2009; Taylor, Hsueh, 2005).

In respect to dynamics of the critical success factors within the online pedagogy for implementing constructivist approach into online education practices and evaluating effectiveness of practices based on learner satisfaction, development and validation a scale is literature gap that needs to be fulfilled (Gazi A, Aksal A, 2011). Therefore, this research is significant as it reveals the development and validation a scale to further evaluate whether online courses have notions of constructivist approach and have impact of developing skills within collaborative learning environment.

METHODOLOGY

The research encapsulates the development and validation a new scale that aims to provide a step for evaluating the notions of the constructivist approach in online courses and practices. This study focuses on the validity and reliability evaluation of 86 items relevant to constructivist online learning process, peer learning and evaluation, collaborative learning outcome, developing skills and online course design. The five main categories were revealed from the result of factor analysis as constructivist online learning process, peer learning and evaluation, collaborative learning outcome, developing skills and online course design (Cohen, Manion, Morrison, 2000).

Participants

The research covered the online learners. In this respect, the scale was given to learners in the 2010-2011 Spring semester. The reason of choice this sample is that this online education practice approaches a constructivist educational philosophy.

The research study included 52 undergraduate students as research participants. Research participants were selected voluntarily from one of the higher education institutions in Turkey. 24(46, 2%) of the participants were female and 28(53, 8%) were male students. Further to this, Table I in below indicates gender and department of participants as demographic information in the research.

Table I. Gender and Department of the Research Participants

Profile of the participants

	Frequency	Percent (%)
Gender		
Female	24	46.2
Male	28	53.8
Total	52	100
Age		
17-20	37	71.2
21-24	13	25.0

25-29	2	3.8
Total	52	100
Department		
BOTE	52	100
Course		
EBT	50	96.2
other	2	3.8
Total	52	100

Instrument

A questionnaire was conducted to volunteer participants that consisted of personal information form, ethical release form and the items. A personal information form provided to reveal the independent variables for this research such as gender, department. In addition to this, ethical release form provided a protocol between participants and researcher to keep the confidentiality and trustworthiness throughout the research process. 86-itemed questionnaire was implemented to expose the developed, valid and acceptable scale in relation to research focus.

In order to generate a scale with its validation, the five steps were followed. The first step encapsulates the extended literature review about the online education practices in higher education. Then, item pool was constructed in relation to literature. After that, draft of the scale was evaluated and reviewed by two experts for the content validity. Further to this, next step included the statistical analysis of the items. The last step is the division of the categories with the supervision of the experts in the field (Namlu, Odabasi, 2007).

Implementing constructivist approach into online education practices and evaluating the effectiveness of this implementation based on learner satisfaction is an imperative and hot issue within the literature. In this respect, various arguments arise on the role of constructivist based online learning process for the advanced knowledge and developing skills from different angles. However, literature stays partial by considering the conceptual framework and not proposing empirical results for the process effectiveness. Although the literature devotes detailed recommendations and gives a general idea on how to design constructivist based online learning environment, turning attention to evaluate this environment therefore developing a scale for that purpose is inevitable.

RESULTS AND DISCUSSIONS

The scale for constructivist approach integrated online education applications had been examined over 86 items. Before the analysis the scale, the calculation of the mean and the standard deviation of each items were done in the scale. 34 of the items were removed from the scale as a result of total correlation as under 0.20 meaning and test-retest correlation as insignificant on the level of .05. In this respect, analysis was done again by the remaining 52 items. As recommended by Chu & Murrmann (2006, p. 1183) after each omission "… alpha values were recomputed for the remaining items and the new corrected correlations were evaluated for further deletion of items.

In addition, the analysis of the score with the minimal score as 85 and the maximum possible score as 289 was found in the scale development. In fact, the expected range is 204 to present each experience from the lowest to highest the range. In this respect, examination of the scale showed that the lowest score was 85 and the highest was 289 and the range was 204 as the scale covered a large part of the expected range.

Further to this, the mean of the scores of this was 192, the median was 194, the Standard deviation was 44, 29. In addition, Skewnes value as it was calculated for distribution was -0.319 and Kurtosis value was 0.72. Therefore, the distribution was sufficient and normal (See Appendix I for Table 2).

For the scale development process, principal component analysis was done by 52 items. Within this framework, Kaiser-Meyer-Olkin (KMO) value was 0.697 in the analysis. KMO tests were also done to determine whether the partial correlations were under limit and the distribution is sufficient or not for factor analysis. The statistical evidences underlined that KMO value need to be over 0.60, and it could be accepted as sufficient if it is close to 0.90 (Nunnally, 1970). In this respect, KMO value for this research is acceptable and sufficient (See Appendix II for Table 3).

The scale development process covered Barletts' test of sphericity (BTS). This test is significant to test correlation matrix=unit matrix of the hypothesis. Correlation between the variables is different from 1 and the factor analysis is appropriate for the variables as the rejection of the hypothesis is the significant evidence for that result. Furthermore, v^2 value for BTS was 1112.208 ($p < 0.0001$) for this study.

Nunally and Bernstein (1994) suggested factor loading of .40 as cutoff value for new scale development studies. According to that point, this research considered 0.40 as the limit. This limit resulted with 10 factors with eigenvalue of over 1. In this respect, as eigenvalue is over 1 for factors was 71.89% for the percentage of variance analysis. Total Variance can be found in Table 4 (See Appendix III). 5 factors were determined since 10 factors represented a large number of sub dimensions.

The cumulative explanation percentage for the 5 factors is 51.682% that can be also presented in Table 4. Total and loading percentage of variance results from the analysis are as the first factor 10,585 and 31.133%, as the second factor 3.561 and 10.474%, as third factor 2.273 and 6.684%, as fourth factor 2.114 and 6.218%, as fifth factor 1.543 and 4.556%. Further to this, variance between 40% and 60% is appropriate for this field. In the variance percentage as it was found over 50% for this research, it is in the acceptable range.

Churchill (1979) and Parasuraman et al. (1986) suggested that the purification of an instrument begins with the computation of Cronbach's alpha coefficient, item-to-total correlation and exploratory factor analysis (EFA). According to varimax rotation, the percentage of variances stated by 5 factors as 14,533% for the first factor, 13.979% for the second factor, 11.623% for the third factor, 10,059% for the fourth factor and 8,550% for the fifth factor with the factor loads that were between 0.50 and 0.78. In this respect, Table 5 (See Appendix IV) included the results of varimax rotation. The examinations showed how the items are in the expected and sufficient parameters. Therefore, the mean of the remaining items were in between 2.69 and 2.09 and the standard deviations were in between .91 and 1.16. As Item total correlations need to be between 0.55 and 0.72, this shows how the correlation is over 0.20 is in the acceptable level. Furthermore, Total cronbach alfa was 0.92. The scale reflected five titles according to the results of the factor analysis. Considering the related literature and the factor analysis of the new scale development, these titles are constructivist online learning process, peer learning and evaluation, collaborative learning outcome, developing skills and online course design. As this research is a step and it opens an academic debate for developing a new scale, applications were limited which it can be repeated for further studies.

REFERENCES

Aksal A, F. (2009). Action plan on communication practices: Roles of tutors at EMU distance education institute to overcome social barriers in constructing knowledge. *The Turkish Online Journal of Educational Technology (TOJET), 8*(2).

Aksal A, F. (2010). *Teaching online course: Communication practices and roles of online tutors*. Germany: VDM.

Austin, R., Smyth, T., Rickard, A.,Quirk-Bolt, N., Nigel, M. (2010). Collaborative digital learning in schools: teacher perceptions of purpose and effectiveness. *Technology, Pedagogy and Education, 19*(3), 327-343.

Bernard, R. M; de Rubalcava, B. R. (2000). Collaborative online distance learning: Issues for future practice and research. *Distance Education, 21*(2), 260-277.

Chu, K. H. L. & Murrmann, S. K. (2006). Development and validation of the hospitality emotional labor scale. *Tourism Management, 27*, 1181-1191.

Churchill, G. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research, 16*, 64-73.

Cohen, L., Manion, L. & Morrison, K. (2000). *Research methods in education.* London: RoutledgeFalmer.

Gazi A., Z., Silman, F., & Birol, C. (2008). TQM implementation in distance education institute: A case of North Cyprus. *Eurasian Journal of Education Research*, 31.

Gazi A., Z. (2009). Implementing constructivist approach into online course designs in Distance Education Institute at Eastern Mediterranean University. *The Turkish Online Journal of Educational Technology (TOJET), 8*(2).

Gazi A, Z., Aksal A, F. (2011). *Handbook of online pedagogy*. Germany:LAP.

Gazi A, Z. (2010). *Preparing and designing online course: Constructivist approach, team work culture*. Germany: VDM.

Jonassen, D. H. (1994). Thinking technology: towards a constructivist design model. *Educational Technology*, 34-37.

Luxton-Reilly, A. (2009). A systematic review of tools that support peer assessment. *ComputerScience education*, *19*(4), 209 -232.

Macdonald, J. (2003). Assessing online collaborative learning: Process and product. *Computers and Education, 40*(4), 377-391.

McLuckie, J., Topping, K. J (2004). Transferable skills for online peer learning. *Assessment & Evaluation in Higher Education*, *29*(5), 563 -584.

McPherson, M., & Nunes, M.B. (2006). Organisational issues for e-learning critical success factors as identified by HE practitioners. *International Journal of Educational Management, 20*(7), 542-558.

Murphy, K. L., Cifuentes, L. (2001). Using Web tools, collaborating, and learning online. *Distance Education*, *22*(2), 285-305.
Namlu, A. G., Odabasi, H. F. (2007). Unethical computer using behaviour scale: A study of reliability and validity on Turkish university students. *Computer & Education, 48*, 205-215.
Nunnally Jr., J. C. (1970), *Introduction to psychological measurement*. New York: McGraw-Hill Book Company.
Nunnally Jr., J. C. & Bernstein, I. H. (1994). *Psychometric theory*. (3rd ed). New York: McGraw-Hill Book Company.
Owens, R., Bozeman, D. (2009). Toward a faculty-librarian collaboration: Enhancement of online teaching and learning. *Journal of Library & Information Services in Distance Learning, 3*(1), 31-38.
Parasuraman, A., Berry, L. & Zeithaml, V. A. (1986). SERVQUAL: A multiple-item scale for measuring customer perceptions of service quality. *Working Paper*, Cambridge: Marketing Science Institute.
Salmon, G. (2002). *E-moderating: The key to teaching and learning online.* London: Kogan Page.
Stacey, E., Smith, P. J., & Barty, K. (2004). Adult learners in the workplace: Online learning and communities of practice. *Distance Education, 25*(1), 107-123.
Taylor, S. I., Hsueh, Y. (2005).Implementing a constructivist approach in higher education through technology. *Journal of Early Childhood Teacher Education, 26*(2), 127-132.
Tu, C., Corry, M. (2003). Building active online interaction via collaborative learning community. *Computers in the Schools, 20*(3), 51-59.
Wallace, M. (2002). Managing and developing online education: issues of change and identity. *Journal of Workplace Learning, 14*(5), 198-208.
Zapalska, A., Brozik, D. (2006). Learning styles and online education. *Campus-Wide Systems, 23*(5), 325-335.

APPENDICES

APPENDIX I

Table 2

Normal distribution analyses

Statistics		
N		
	Valid	52
	Missing	0
Mean		192.0000
Standard error of mean		6.14266
Median		194.0000
Mode		173.00
Standard deviation		44.29535
Variance		1962.078
Skewness		-0.319
Standard error of skewness		0.330
Kurtosis		0.072
Standard error of kurtosis		0.650
Range		204.00
Minimum		85.00
Maximum		289.00
Sum		9984.00

a Multiple modes exist. The smallest value is shown.

APPENDIX II

Table 3
KMO and Bartlett_s test

Kaiser–Meyer–Olkin Measure of sampling Adequacy 0.670		
Bartlett's test of Sphericity	Approximate v2	1112.208
	df	561
	Sig.	000

APPENDIX III

Table 4

The results of factor analysis total variance explained

Component square	Initial Eigenvalues			Extraction sums of squared loadings			Rotation sums of loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative%	Total	%of Variance	Cumulative
1	10.585	31.131	31.131	10.585	31.133	31.133	4.948	14.553	4.553
2	3.561	10.474	41.607	3.561	10.474	41.607	4.753	13.979	8.532
3	2.273	6.684	48.291	2.273	6.684	48.291	3.952	11.623	0.155
4	2.114	6.218	54.508	2.114	6.218	54.508	3.420	10.059	0.214
5	1.549	4.556	59.064	1.549	4.556	59.064	3.009	8.850	9.064
6	1.324	3.894	62.959						
7	1.272	3.742	66.701						
8	1.171	3.446	70.146						
9	1.040	3.060	73.206						
10	1.023	3.008	76.215						
11	0.840	2.470	78.685						
12	0.823	2.421	81.106						
13	0.659	1.938	83.044						
14	0.638	1.877	84.921						
15	0.612	1.800	86.721						
16	0.559	1.644	88.365						
17	0.515	1.514	89.879						
18	0.479	1.410	91.289						
19	0.439	1.272	92.561						
20	0.381	1.120	93.682						
21	0.359	1.056	94.737						
22	0.311	0.916	95.653						
23	0.239	0.704	96.358						
24	0.213	0.626	96.983						
25	0.173	0.510	97.493						
26	0.170	0.501	97.995						
27	0.144	0.422	98.417						
28	0.139	0.410	98.827						
29	0.107	0.315	99.142						
30	0.095	0.280	99.422						
31	0.071	0.208	99.630						
32	0.060	0.175	99.805						
33	0.039	0.116	99.921						
34	0.027	0.079	100.000						

Extraction method: principal component analysis.

APPENDIX IV

Table 5
Scale mean, standard deviation, item total, factor analysis and factor loading

Items and factors	Mean	SD	Item total	Varimax Factor load
Constructivist online learning process α=0.885				
PD 9. Construction of knowledge requires engagement to collaborative solutions on problems.	2.4231	1.05433	0.668	0.774
PD 11. Active creation of knowledge is based on collaborative learning environment.	2.5769	0.97711	0.660	0.739
PD 5. Construction of knowledge is based on team work.	2.4233	1.07277	0.661	0.675
PC 7. Tutor considers motivation of the learners during the course.	2.5577	0.99830	0.550	0.660
PD 15. Knowledge and understanding are demonstrated through sharing relevant information.	2.2885	1.16040	0.686	0.648
PB15. This learning experience provides problem solving.	2.5000	1.03848	0.656	0.642
PA23. Learning activities supports to get.	2.3077	0.96077	0.631	0.622
PB9. Learning is an active, social process.	2.4231	1.10872	0.579	0.606
PC9. Tutor keeps records of learning progress of the learners.	2.5962	1.17590	0.630	0.592
Peer learning and evaluation: α=0.873				
PA32. Learners construct their own knowledge actively by eliciting specific communicative activities.	2.5000	1.14618	0.667	0.743
PA49. Learners are flexible.	2.5000	1.16316	0.641	0.696
PA31. Positive and social climate is necessary in developing and sustaining collaborative learning in this course.	2.3462	1.10053	0.614	0.681
PA28. Learner has positive attitude and confidence to be enrolled to this course.	2.4615	1.09296	0.728	0.676
PA22. This course guides gaining power of own responsibility on learning.	2.6923	1.09434	0.662	0.661
PA27. Posted messages, involved activities, survey can be the evidence to understand how this course improves learning and skills.	2.2885	1.10855	0.664	0.661
PA52. Skills such as critical thinking, communication and teamwork are the basic skills that are evaluated.	2.4808	1.16300	0.584	0.660
PB7. Learning process requires self evaluation and control.	2.3269	1.1327	0.486	0.563
Collaborative learning outcome: α=0.837				
PC10. Communication tools and technological facilities need to be under control.	2.0962	0.97538	0.553	0.760
PE19. Learner has intellectual flexibility.	2.3654	1.08517	0.700	0.615
PE25. Learner has communication, problem solving, team building, reflective thinking abilities.	2.3269	0.98461	0.675	0.573
PE18. Learner has ability of higher order thinking.	2.4615	1.09296	0.673	0.572
PB24. Learners are satisfied with online collaborative learning process.	2.2115	0.91473	0.595	0.531
PB22. Task based learning creates environment for shared cognition.	2.2308	0.96234	0.603	0.770
Developing skills: α=0.794				
PE6. Learner has ability to think critical.	2.5385	1.03775	0.694	0.778
PE5. Content and developing skills are relevant to the learners.	2.4615	1.01868	0.638	0.702
PE7. Learner has ability to make judgment.	2.4615	1.19577	0.643	0.698
PE15. Learner is decision maker on learning process.	2.3654	0.81719	0.471	0.617
Online Course Design: α=0.754				
PA 16. Course contents provide for and encourage multiple perspectives.	2.3846	1.06925	0.594	0.745
PB1. Learning is constructed through interactions with others.	2.3654	0.86385	0.635	0.696
PA39. Skills are domain specific and knowledge rich.	2.2115	0.91473	0.394	0.586
PA41. This course provides potential learning through development of group work, presentation and peer evaluation.	2.2692	1.10463	0.495	0.543
PA47. Attitude and motivation affect learner performance.	2.1538	0.89409	0.513	0.534

A STUDY OF 8th GRADERS' PERCEPTIONS OF SOCIO-CULTURAL PERSPECTIVE OF CREATIVITY BY USING INFORMATION TECHNOLOGY TOOLS IN REALISATION OF HOMEWORK GOALS

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ABSTRACT
The study aims at evaluating the perceptions of 8th graders towards the use of information technologies ranging from the internet and multimedia tools in socio-cultural perspective of creativity while they are doing their homework in the light of the National Education Ministry's regulation related to elementary and secondary school students' extra-curricular activities. The population of the research that was realised by data collected through survey method consists of 8th grade students in elementary and secondary schools in Istanbul. Randomly chosen 435 students from five schools in Istanbul make the sample of the research. In terms of students' perceptions, results of the study show that regardless of gender, students enjoy discovering and exploiting online and offline resources through problem solving skills especially when they have the opportunity to do this on their own, which also shows that they think they feel more confident, mobile and creative in cyber but socio-cultural reality.
Keywords: homework, creativity, information technologies, multimedia

INTRODUCTION

Technological advances make us reconsider and ascertain whether new instructional methods modify or even magnify children's learning styles. Some studies report change in learning style as a function of computer-assisted learning. As the internet and other computer-based communication tools become prevalent in homes and schools, students' use of these tools for their homework will rise. As a result, the new trend in doing homework has also been under great changes and influences from past to present. The issue bears essential focal points to study in terms of students' changing perceptions and attitudes towards homework along with the importance attached to it. In this respect, style of new homework trends especially with young learners would be of greater concern to examine.

In addition, homework is a powerful tool that can contribute to the advancement of children's education and knowledge. Homework is a kind of out-of-school learning that has not yet received the serious attention that it merits in the research literature. School systems need to give serious attention both to increasing awareness of homework motivation and preferences in children and in parents and to providing them with the information and techniques required to accommodate homework assignments to these preferences as well as their motivation levels and sources (Milgram, 2000). Schools that can meet similar needs are more likely to promote a better understanding of homework.

When we talk about homework, we assume that homework should reflect a productive and participatory aspect of learning in which learners' involvement is the most significant element. Using today's technological instruments as facilitators, a well-assigned homework is meant to stimulate students' creativity and the need to communicate and share with his or her peers in rich learning environment. In this respect, creativity is conceived as a product of two different types of mental processes. First, some processes are used in the generation of cognitive structures (memory retrieval, association, mental synthesis, mental transformation, analogical transfer and categorical reduction). The second type of processes cover those used to explore the creative implications of the structures (attribute finding, conceptual interpretation, functional inference, contextual shifting, hypothesis testing and searching for limitations). According to the socio-cultural perspective, understanding creative people and objects demonstrates that artistic innovations emerge from joint thinking, exchanges among people, which emphasizes the role of social dimension of creativity. In the socio-cultural perspective, creativity relies on experience, needs and interests in which needs are expressed (Decortis & Lentini, 2009).

Creative individuals are generally very good problem solvers and enjoy a variety of experiences. They have an ability to read a book or look at a situation and each time the book or situation is revisited, a new idea or approach is developed. Creativity thrives on emotion and is process driven rather than focusing on the end result. School is very goal oriented. Although we may like to think that students should learn 'for the sake of learning, the reality is that the goal of most schools is to have the students perform well on the exam. For a student to do well in this system, the student needs to be driven by wanting to complete a goal. Students should view assignments as part of a process and not as end result (Weiner, 2010).

Thus, an educational system that is based on creativity encourages the creativity and works for achieving creativity. It is too necessary to educate and train the people who can develop the society towards the best, who can use their creative capabilities and take the responsibilities of competitive changing world on the national and international basis. The doubling of knowledge is taking place in less time while we are advancing forward. This cumulative knowledge only can be learned just by an educational system that depends on aiming creativity and using methods of creativity. The basis of development and improvement is formulated by advanced technology. Technology is a product of creative works and is a very wide and fertilized area for creativity (Rıza, 2001). By using technological aids in homework preparation process, it should not be wrong to look for the ways of improving and reinforcing creativity with other personality traits from socio-cultural perspectives.

However, it should be kept in mind that for every kind of innovation, overuse in informational technology and its negative results leading to computer addiction are the risks which should not be missed. Computer teachers are in a position that they may realize the behaviors of the students like excessive use of computer and the internet and can decide on which behaviors worth to convey to school consultants as well. As a result, it is important that the teachers have knowledge on this subject (Yılmaz, 2008).

LITERATURE REVIEW

The use of technology in the classroom to enhance student achievement is a timely topic that pervades educational literature today. However, the literature is practically devoid of evidence for the uses of technologies to enhance both short- and long-term homework assignments. Teachers often assign homework to provide extra practice to students without regard to individualized needs for such practice. In turn, homework is often viewed by students as nothing more than "busy work" and therefore inconsequential to their learning. Technology can be used to change these three types of homework from paper-and-pencil "chores" or "busy work" to motivating learning opportunities that extend classroom learning into the home. Emphasizing a student's individual abilities and interests with regard to homework has been a daunting task in the past. Not many teachers had the time or energy to assign individualized homework assignments to meet student needs. In fact, the same assignment—one that all students could complete—was often given to all students regardless of their individual instructional needs, thus resulting in the "busy work" perception. Using technology, teachers can now move from the role of "assigner and designer" of the homework assignment to "facilitator" for the homework reinforcement process. Rather than requesting that all students complete a specified generic assignment, the teacher can ask students to use technology to practice the skills or display the knowledge learned. Extending the use of technology to the home by assigning meaningful homework accomplishes three goals. First, it encourages meaningful homework assignments designed to meet the individual reinforcement needs of students. Second, it provides practice of valuable technology skills that will serve students well beyond the completion of the homework itself. And third, it provides students with homework activities that are engaging and fun (Zisow, 2000). So homework can be considered as a fruitful tree with numerous branches to hold on.

Homework is intended to be a positive experience that encourages children to learn; assignments should not be viewed as punishment. Research on homework during the last decade began to focus on the relationship between homework and student achievement, and has greatly strengthened the case for assigning homework. Although there are mixed findings about whether homework actually increases students' academic achievement, many teachers and parents agree that homework develops students' initiative and responsibility, and fulfils the expectations of students, parents, and the public (Milbourne & David, 2000). On the other hand, how to realizes this still remains to be an issue of various discussions in the literature.

Homework, without any support and guidance especially for young learners, can go no further than being just a "mission impossible" for both learners and families. For that reason, traditional understanding of homework and its prerequisites need revision or second thoughts so that a more creative, collaborative and supportive approach can be developed to enhance learners' performance and enthusiasm. Smolira (2008) examined student perceptions concerning online homework assignments in an introductory finance class. In general, students felt that online homework was preferable to traditional homework assignments that are turned in to the instructor. In addition, students reported that the homework assignments increased their understanding of the material and the time they spent in preparing for the class. In that sense, technology and learners' perceptions of role of homework are issues that have different reflections on the tasks and responsibilities taken up during the learning process. Human beings as social creatures blended with culture are forced to state a purpose and take a position in this very digital age. Learners are no exception to this rule; neither can they be exempted from it.

METHOD

The study aims at measuring the relationship between the perceptions of socio-cultural perspective of creativity of 8th graders and the use of information technologies while doing homework. In addition, variables such sharing, cooperation, researching, problem solving, entertainment, self-confidence and communication were studied within students' socio-cultural creativity while organizing their homework in the light of the Turkish Ministry of National Education's regulation related to elementary and secondary school students' extra-curricular activities. For data analysis, frequency analysis and t-test were used.

FINDINGS

Frequency Analysis

In the study, 48,7 % of participants were male and 51,3% were female. The character traits (CT) question regarding which aspect they think doing homework by using the internet and computer tools reinforce had six choices: 1) Sharing 2) Cooperation 3) Researching 4) Self-confidence 5) Creativity 6) Communication. The frequency data for each choice has the following results:

92,2 % of the students think that using the internet and computer tools while doing homework helps them regain self-confidence followed by 88,7 % for cooperation, 82,1 % for communication, 78,4% for sharing, 75,9 % for creativity. 16,1 % of students reported that the internet and computer tools did not help them develop their research skills.

As to whether students discuss the homework topic online, 59,1 % reported they did so. While 58,6 % of students discussed it with their friends, 25,4 % with family members and 16 % with their teachers.

Concerning the most frequent tool they used for discussing homework topics was chat programs by 56,1 %, which was followed by e-mail (20%), face to face (17,8 %) and telephone (5,3%).

While doing their homework on the internet and computer, by 43,9 %, students stated that they preferred to do it on their own and 34,7 % with their friends.

Finally, as to the question whether they benefited from the internet and computer tools about experiments, observations and inventions included in their homework, by 85,5 % students responded " Yes" and by 14,3 % " No"

t-Test

As a result of the t-test that was applied to see whether there is a significant difference among female and male students related to the answers given to the questions as to whether they think that they gain problem solving skills (PS) research opportunities (R) and they entertain themselves (E) while doing homework by using the internet and computer tools, following findings were obtained:

Table 1: Descriptive Statistics

	Sex	N	Mean	Std. Deviation	Std. Error Mean
PS	Male	211	2,2512	1,10774	,07626
	Female	222	2,1712	1,00112	,06719
R	Male	212	1,8349	1,01930	,07001
	Female	222	1,9099	1,00271	,06730
E	Male	212	1,6557	1,15579	,07938
	Female	221	1,5294	1,00240	,06743

The above Table shows that there is no significant difference between the averages and standard deviations of the related answers given to the three questions (PS, R and E) by 211 male and 222 female students.

As a result of the t- test that was applied to see whether there is a significant difference between female and male students related to the answers given to the questions PS, R and E, no significant difference was found at 5% significance level. (Significance values > 0,05 were highlighted).

Table 2: t-Test for Differences between the Genders

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
PS	Equal variances assumed	2,317	,129	,789	431	**,430**	,08001	,10138
	Equal variances not assumed			,787	421,328	,432	,08001	,10164
R	Equal variances assumed	,166	,684	-,773	432	**,440**	-,07500	,09707
	Equal variances not assumed			-,772	430,314	,440	-,07500	,09711
E	Equal variances assumed	4,331	,038	1,216	431	,225	,12625	,10385
	Equal variances not assumed			1,212	417,084	**,226**	,12625	,10415

As a result of the t- test applied to see whether there is a significant difference between the answers given to the questions PS, R and E and the answers given to the questions whether they benefit from a single source (SS) or multiple sources (MS) while doing their homework on the internet and computer, following results were obtained:

Table 3: Descriptive Statistics

	SS and MS	N	Mean	Std. Deviation	Std. Error Mean
PS	From a single source	53	2,3019	1,15334	,15842
	From multiple sources	380	2,1974	1,04034	,05337
R	From a single source	53	2,1111	1,16013	,15787
	From multiple sources	380	1,8395	,98432	,05049
E	From a single source	53	2,0000	1,35873	,18664
	From multiple sources	380	1,5342	1,02547	,05261

The above Table shows that while 53 students benefited from a single source, 380 students benefited from multiple sources while doing homework on the internet and computer. No significant difference was found between the averages and standard deviations of the answers given to the three questions by students in both groups.

Table 4: t-Test for difference between SS and MS

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
PS	Equal variances assumed	1,880	,171	,676	431	**,499**	,10452	,15464
	Equal variances not assumed			,625	64,358	,534	,10452	,16717
R	Equal variances assumed	1,168	,280	1,854	432	**,064**	,27164	,14653
	Equal variances not assumed			1,639	64,304	,106	,27164	,16575
E	Equal variances assumed	12,141	,001	2,966	431	,003	,46579	,15707
	Equal variances not assumed			2,402	60,538	**,019**	,46579	,19391

As a result of the t-test applied to see whether there is a significant difference between " benefiting from a single source" and " benefiting from multiple sources" related to the questions PS, R and E, no significant difference was found for questions PS and R at 5% significance level and similarly for the students in both groups (sig. values>0,05). On the other hand, in parallel with the answers given to question E, a significant difference at 5% significance level was found between the students in two groups. (Sig. value <0,05).

Related to the answers given to the questions PS, R and E, in order to find whether there is a significant difference regarding the question whether students discuss (D) the homework topic or not while doing their homework, following results were founds as a result of the t-test applied.

Table 5: Descriptive Statistics

	D	N	Mean	Std. Deviation	Std. Error Mean
PS	Yes	257	2,0817	,99860	,06229
	No	170	2,4000	1,10620	,08484
R	Yes	257	1,8288	,97721	,06096
	No	170	1,9474	1,06419	,08138
E	Yes	257	1,5798	1,06912	,06669
	No	170	1,6000	1,10083	,08443

The above Table shows that while 257 students discussed the homework topic, 257 of them did not so. While there is no significant difference between the averages and standard deviations of the answers given to the questions R and E by the students in two groups, it was observed that the averages differentiated in question PS (yes:2,08 no:2,4)

Table 6: t-Test for D

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
PS	Equal variances assumed	6,608	,010	-3,088	425	,002	-,31829	,10308
	Equal variances not assumed			-3,024	335,879	**,003**	-,31829	,10525
R	Equal variances assumed	,720	,397	-1,186	426	**,236**	-,11857	,09995
	Equal variances not assumed			-1,166	342,645	,244	-,11857	,10168
E	Equal variances assumed	,213	,645	-,189	425	**,850**	-,02023	,10695
	Equal variances not assumed			-,188	354,557	,851	-,02023	,10759

Related to the answers given to the questions PS, R and E, as a result of the t-test applied in order to find if there is a significant difference between whether students "discuss the homework topic" and "not discuss it" (question D), no significant difference was found between the two groups of students for questions R and E at 5% significance level (sig. values>0,05). On the other hand, in parallel with the answers given to the question PS, a significant difference at 5% significance level was found between the two groups of students.

CONCLUSION

As specified in the related parts of the National Education Ministry's regulation related to elementary and secondary school students' extra-curricular activities, homework, an essential tool in education, is meant to serve as a basic socio-cultural educational medium that helps student develop and improve personal and academic skills. Our results regarding socio-cultural perceptions of 8th graders' creativity show that young learners feel freer, more confident and secure while they are using the internet and computer tools while doing homework. Although most children like participants in our study feel more comfortable with the use of online and offline tools in their engagements, it should be kept in mind that apart from their enhanced efficiency, computer technologies alone should not be prescribed as a unique cure for extra-curricular educational activities such as homework. Our study is meant to shed light on how students in the study perceive computer mediated homework performance and preparation techniques in terms of socio-cultural creativity in comparison to what is stated in the school regulation. Obtained results in general put forward a positive but still attentive approach concerning students' use of computers and the internet tools in doing homework. The line between education and homework is so delicate that objectives and tools stated in the Ministry's regulation regarding homework can change lines depending on how computers and the internet enter the scene. We hope that this study has managed to draw attention to highlighted theory and changing practice of students' productivity and creativity perceptions from both social and cultural perspectives for the present and future applications.

REFERENCES

Decortis, F. & Lentini, L. (2009). A Socio-cultural Perspective of Creativity for the Design of Educational Environments "eLearning Papers 1 Nº 13 • April 2009 • ISSN 1887-1542. Retrieved from http://pedagogy.ir/images/pdf/creativity-edu-env.pdf (11.04.2011).

Milbourne, L. A. & Haury, D. L. (1999). Helping Students with Homework in Science and Math. Retrieved from http://www.eric.ed.gov/PDFS/ED432454.pdf (12.02.2011).

Milgram, R. M. (2000). Homework: Motivation & Learning Preference. Westport, CT, USA: Greenwood Publishing Group, Incorporated.

Riza, E. T. (2001). Creativity: A New Era In Educational Technology, The Turkish Online Journal of Educational Technology – TOJET October 2002 ISSN: 1303-6521 volume 1 Issue 1 Article 2, Retrieved from http://www.tojet.net/articles/112.pdf (14.03.2011).

Smolira, C. J. (2008). Student Perceptions of Online Homework in Introductory Finance Courses, *Journal of Education for Business*, Vol. 84, No. 2, Nov/Dec. 90-95 Heldref Publications.

Weiner, W. H. (2010). "Why Creative Students Fail To Complete Assignments" Retrieved from http://reseteducation.wordpress.com/2010/03/27/why-creative-students-fail-to-complete-assignments/ (14.03.2011).

Yılmaz, B.M. (2008). Analysing the Computer Addiction Aptitudes of 6th And 7th Grade Students According to Different Variables. Anadolu University, 8th International Educational Technology Conference. Retrieved from http://ietc2008.home.anadolu.edu.tr/ietc2008/115.doc (12.02.2010).

Turkish Ministry of National Education (Milli Eğitim Bakanlığı). Retrieved from http://mevzuat.meb.gov.tr/html/20336_0.html (20.02.2011).

Zisow, M. (2000). Teaching Style and Technology, Journal of TechTrends, Volume 44, Number 4 / May 2000, 36-38. Retrieved from. http://www.springerlink.com/content/8756-3894/44/4/ (14.03.2011).

A USABILITY STUDY OF INTERACTIVE WEB-BASED MODULES

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ABSTRACT
This research advances the understanding of the usability of marketing case study modules in the area of interactive web-based technologies through the assignment of seven interactive case modules in a Principles of Marketing course. The case modules were provided for marketing students by the publisher, McGraw Hill Irwin, of the *Marketing* textbook by Grewal and Levy (2010). Using a survey instrument, the study examines student perceptions of how useful the interactive modules are in students' learning of the selected marketing concepts, how difficult/easy it is for students to use the modules, and how helpful the module assignments were in receiving a better course grade. The results indicated that students perceived that the modules were easy to use and useful in learning of the marketing concepts. The number of completed modules increased students' actual course grade and module assignment grade. On an average, students indicated that the ideal number of interactive modules was seven in a semester. In addition, students' class attendance was positively correlated with their grades. Lastly, females achieved a higher average module assignment grade than males did.
Keywords: Interactive modules, Web-based technology, Usability

INTRODUCTION
The latest demographic research suggests that the current student is multi-task oriented and has a short attention span (Cluskey, Elbeck, Hill, & Strupeck, 2011). As educators experience changing student demographics, it is important to consider whether or not Web-based pedagogical methods enhance student learning, and how Web-based interactive technology can aid in learning important concepts. Given such trends, educators need to promote constructive discussions regarding ways to update existing pedagogies and add new learning activities to or modify existing ones to meet the needs of a changing student profile that reflects different learning styles.

Studies about student perceptions in traditional classrooms (face-to-face courses) that use computer-mediated communications (CMC) are limited (An and Frick 2006). Computer-aided interactivity appears to be a method that can be used in marketing courses as a tool that incorporates student's aptitude and comfort with computer technology into traditional marketing pedagogies to learn marketing concepts. Jaffee (1997, p. 268) defines interactivity as "regular interaction between teacher and students, among students, and between students and the learning environment." Computer-aided interactivity uses computer programs to enhance learning with activities that users can respond to (Pickett et al. 2000). Although much has been written about how computer-aided interactivity enhances the students' learning process, there is little empirical evidence about how students learn with technology (Close, Dixit, and Malhotra 2005). Furthermore, Achenreiner (2001) suggests that more studies are needed that match existing pedagogies with technology interfaces.

Because marketing educators may typically not be trained to develop web-based, computer-aided case study assignments, they may choose to use the web-based interactive case study modules that accompany textbooks to supplement their lecture-based teaching methods. However, it may be difficult for educators to combine traditional pedagogical (face-to-face) methods with interactive technology tools (O'Connor and Girard 2006). The authors believe that computer-aided teaching methods are useful in student learning if implemented effectively. CMC may be preferred by diverse learners because students can interact with case study materials online and have time outside of the classroom to review and comprehend the materials. Given the changing and diverse student profiles, it has been suggested that CMC may be useful in helping students focus on the case study information at hand more effectively (Berge and Collins 1993; Harasim 1990; Leasure, Davis, and Thievon 2000).

With this concern, this study reports student outcomes and perceptions of Principles of Marketing case studies in a web-based format for individual students. It advances the understanding of the value of technology as a tool for learning marketing concepts by describing the student perceptions of using web-based interactive case study modules.

LITERATURE REVIEW

Case studies are typically used by marketing educators to help students gain real world knowledge and learn marketing concepts (O'Connor and Girard 2006) and are important tools for students to develop their analytical thinking and problem-solving skills through applied construction of reality (Henson, Kennett, and Kennedy 2003). In a Principles of Marketing course, for the first time many students are faced with the challenge of having to organize, understand, and solve the problems presented in case studies, and might even be overwhelmed with the process (O'Connor and Girard, 2006). Particularly, Newell, Titus, and West (1996) find that marketing students perceived that their quantitative skills are lacking. In a study, Krentler and Willis-Flurry (2005) demonstrate that the use of technology enhances student learning but also this relationship is moderated by variables such as the students' major and amount of their Internet use.

"Marketing educators are challenged with how to integrate technology into their courses to enhance student learning of marketing concepts and prepare them for careers in marketing" (O'Connor and Girard 2006, p 375). Most educators have integrated technology into traditional courses (Hannaford, Erffmeyer, and Tomkovick (2005). Researchers reported that technology created gateways for learning and enhanced the learning experience (Clarke III, Flaherty, and Mottner 2001). Technology and the Internet not only "facilitate" and "enhance learning" (Close, Dixit, and Malhotra (2005, p. 91) but also help develop skills needed in marketing careers (Strauss and Frost 1999).

Still, the number of published studies on how and how much students learn with technology and technology's effectiveness in the marketing classroom are limited (Krentler and Willis-Flurry 2005; Close, Dixit, and Malhotra 2005). Achenreiner (2001) points out that only a few studies have focused on how technology interfaces with different approaches to learning, and comments that case studies including problem solving are one area that needs further examination. Marshall and Michaels (2001) suggest educators use the type of technology that is focused on the course's emphasis and content. Priluck (2004) investigates student satisfaction level for two technologically different teaching methods in two sections of a Principles of Marketing course. Students were more satisfied with a traditional method of teaching using lectures, in-class discussions, assignments, and exams in developing their skills and course knowledge compared to a web-based method that integrated 7 out of 14 class meetings online. On the other hand, O'Connor and Girard (2006) find that students did not perceive that technology increased their learning but it made their learning process more interesting. The mixed findings from different studies suggest that educators need to maintain a balance between traditional and electronic methods (Malhotra 2002; Priluck 2004; Marshall and Michaels 2001; Close et al. 2005; Clarke et al 2001; O'Connor and Girard 2006). Studies also show that using technology generates a positive response by students if they are real world based (Karns 2005).

Picciano (2002) reports from the literature that interaction is important for a successful course. "Web-based delivery systems are popular electronic tools that have been effectively used in diverse marketing courses" (O'Connor and Girard 2006, p. 375). However, the nature and extent of the Web-based interaction and its effects on student performance remain unanswered (Picciano 2002). Overall advantages of Web-based learning over traditional course methods for students include Web-based interactivity, real-time communication, and self-motivated learning (O'Connor and Girard 2006). Web-based delivery systems can support multiple data formats including audio, video, and graphics, and can be updated if necessary (Kaynama and Keesling 2000; O'Connor and Girard 2006). Nevertheless, the question still exists regarding whether technology actually helps student learning of the marketing concepts (Close et al. 2005).

Therefore, this study aims to explore whether interactive case study modules for Principles of Marketing students are easy to use, and whether the number of interactive case study modules completed lead to a higher overall course grade, and an overall module assignment grade. In addition, the study examines whether students' semester standing and class attendance percentage are positively correlated with their perceptions of ease of completing the modules; lastly, the study investigates whether gender and student's option make significant difference in the overall module assignment grade and course grade. The research objectives are to find out whether:

> **RO1:** Students will find that web-based interactive case studies are easy to use. More specifically, their perceptions will be higher than being neutral.
>
> **RO2:** The number of modules completed will positively correlate with students' course grade and overall module assignment grade.

RO3: Students' semester standing and class attendance percentage will positively correlate with their overall course grades and module assignment grades.

RO4: Differences exist in the overall module grades based on gender and student's option. More specifically, females and students of marketing/management option will receive higher module assignment grade and course grade.

METHODOLOGY

The web-based marketing case modules were provided for marketing students by the publisher, McGraw Hill Irwin, of the *Marketing* textbook by Grewal and Levy (2010) at the publisher's web site: https://cms.psu.edu/section/content/default.asp?WCI=pgDisplay&WCU=CRSCNT&ENTRY_ID=C3869829D49C48829AE1E2EF3B4FD375. The students were asked to complete seven module assignments as part of their course requirement throughout a semester at a large university in the north-eastern part of the United States. After the completion of seven interactive case modules, voluntary participation in a survey was offered to the students in order to investigate the objectives of the study. A total of 96 students who registered for a Principles of Marketing course in a semester participated in the study. As an incentive, one bonus point credit was offered for a voluntary participation in the survey and was counted toward students' in-class participation grade.

In order to test the usability of the web-based interactive case modules, fourteen scaled-questions were asked. In addition, actual course grade, overall module assignment grade, number of modules completed by each student, student's class attendance percent, and student's semester standing were captured from the students' course grade sheet for the analyses.

FINDINGS AND DISCUSSIONS

The sample profile indicated that 69.5 percent of the students were males and 30.5 percent were females. Students of the marketing/management option comprised 48 percent of the sample, finance 12 percent, accounting 17 percent, entrepreneurship 3.4 percent, and other options 11 percent. Almost 8 percent of the students were undecided regarding their option.

A Principle Component Analysis with Varimax rotation revealed three dimensions with 60 percent variance explained. The item, "How clear was the language?" loaded on two dimensions. Because this item did not show clear measurement of a specific dimension, it was removed. The loadings are shown in Table 1.

To examine RO1, one sample t-test with the test value of 3 (mid-point) is used and the means and standard deviations of the statements measured on a 5-point scale were examined. All of the means of the statements were significantly higher than the mid-point at $p < .01$ level (Table 1). This indicates that students overall perceived that the modules were easy to use and useful in learning of the marketing concepts. The reliability analysis revealed Cronbach's Alphas ranging from .61 to .86.

Table 1: Usability and Usefulness of Modules

Usability Items	**Measurement Scale**	**Mean**	**S. D.**	**t-value**	**Loadings**		
					CA=.86	CA=.74	CA=.61
1.While completing the modules, did you:	1= Feel completely lost; 2= Feel a little lost; 3= Neutral; 4= Know what to do most of the time; 5= Always know what to do next	3.78	.81	**9.3*****		**.59**	
2.Compared to what you expected, did the tasks go:	1= Much slower; 2=Slower; 3=Neutral; 4=Faster; 5=Much faster	3.6	.76	**7.7*****			**.82**
3. How easy/difficult was it to understand the tasks asked of you?	1= Very difficult; 2=Difficult; 3=Neutral; 4Easy; 5=Very easy	3.74	.84	**8.5*****		**.81**	
4. Overall, how easy/difficult was it for you to complete required phases?	1= Very difficult; 2=Difficult; 3=Neutral; 4Easy; 5=Very easy	3.78	.81	**9.3*****		**.61**	
5. How easy/difficult was understanding the information presented in the modules?	1= Very difficult; 2=Difficult; 3=Neutral; 4Easy; 5=Very easy	3.64	.77	**8.1*****		**.55**	

6. How relevant were the graphics to the content?	1= Very irrelevant; 2=Irrelevant; 3=Neutral; 4=Relevant; 5=Very relevant	4.01	.89	**11.0*** **	**.57**		
7. How clear was the language?	1=Very unclear; 2=Unclear; 3=Neutral; 4=Clear; 5=Very clear	3.97	.83	**11.4*** **		.47[a]	
8. Overall, how easy/difficult was using the modules?	1= Very difficult; 2=Difficult; 3=Neutral; 4=Easy; 5=Very easy	3.99	.75	**12.8*** **			**.71**
9. Overall, how useful was the modules' content to your learning?	1=Very useless; 2=Useless; 3=Neutral; 4=Useful; 5=Very useful	3.47	.85	**5.3*** **	**.81**		
10. I completely understood the material:	1=Strongly disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree	3.46	.89	**5.0*** **		**.71**	
11. Working with the interactive modules was fun	1=Strongly disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree	3.37	.96	**3.8*** **	**.68**		
12. How helpful were the modules for you in learning specific course materials?	1=Not helpful at all; 2=Not helpful; 3=Neutral, 4=Helpful; 5=Very helpful	3.46	.89	**5.0*** **	**.79**		
13. Completing the modules helped me get higher grades on exams	1=Strongly disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly Agree	2.72	.92	**-2.9*** **	**.77**		
14. Would you recommend the modules be used in future Principles of Marketing classes	1=Definitely no; 2=No; 3=Neutral; 4=Yes; 5=Definitely yes	3.78	1.0	**7.6*** **	**.81**		

***$p < .01$

[a] Deleted

To investigate RO2, a Pearson correlation analysis was performed. The number of completed modules was significantly correlated with students' actual course grade (.63) and module assignment grade (.98) at p < .01 level. The actual course grade and the module assignment grade was also significantly correlated (.66) at p < .01 level. On an average, students indicated that the ideal number of interactive modules was seven in a semester. In addition, the number of completed modules was not significantly correlated with any of student perceptions regarding the usefulness and ease of use of the modules.

In examining RO3, student's attendance record was positively and significantly correlated with both module assignment grade (.30) and overall course grade (.62) at p < .01 level. However, while students' semester standing (how far the student is in the degree program) was not correlated with module assignment grade, it was negatively and significantly correlated with their actual course grade (-.30) and their class attendance record (-.33) at p < .01 level.

For RO4, a t-test was performed to see whether females scored a significantly higher course and module assignment grade than males did. The course grade was not significantly different; however, females' module assignment grades (mean=93, n=29) were significantly higher than those of males (mean=86, n=66) with t= -2.17 at p < .05 level. Student's field of study (option) did not have significant relationship with their module assignment grade; however, the students with an option in finance (mean=93.7) had significantly higher course grades in the Principles of Marketing course than those with other options such as Accounting (86.5), and Entrepreneurship (80.9) option.

LIMITATIONS

This study used a convenience sample, and was limited to two sections of Principles of Marketing taught in a semester at one large university in the north-eastern region of the United States. Therefore, the study cannot be generalized to all Principles of Marketing students. Student's comfort level with technology and prior experiences or expertise with Web-based tools were unknown. Furthermore, some of the students had technical difficulties using the modules during the submission process (incompatibility between Mac vs. Windows-based programs), which might have biased the survey responses.

Time constraints also limited this study. If students underestimated the amount of time they needed and waited until the last minute to complete the module, this might have biased both student performance and survey results. Indeed, there were a few students who submitted their answers at the last minute, right before the deadline. Future research may include providing greater interactivity such as working in groups rather than individually and allowing students to collaborate and discuss the case while working on the module to improve the learning experience.

CONCLUSIONS

The findings from this study correspond with Pickett et al. (2000) that computer-aided interactivity enhances learning. Overall, students' feelings about the interactive case modules were positive; however, they did not feel that the modules helped increase their grades on exams. This is expected because the modules focus on specific concepts while exams assess a broad area of knowledge. This study found an interactive web-based case module helped the learning marketing concepts and were easy to use. Clarke III, Flaherty, and Mottner (2001) state that although there is no empirical evidence that it helps students learn, electronic interaction between students should be encouraged. The findings of this study are also consistent with those of O'Connor and Girard (2006) study that indicated modules made learning of the marketing concepts easier.

The number of completed modules was positively correlated with the module assignment grade and the course grade. This means students are encouraged to complete as many modules as possible to better their course grade. Student's attendance record was also positively and significantly correlated with both module assignment grade and overall course grade. However, while students' semester standing (e.g., freshman, sophomore) was not correlated with module assignment grade, it was negatively and significantly correlated with their actual course grade and their class attendance record. This finding warrants further research to understand why students with a higher semester standing have difficulty receiving higher course grade and attending the classes more frequently than their counterparts with a lower semester standing.

The study also found that the course grade was not significantly different between males and females; however, females' module assignment grades were significantly higher than those of males. This may result from the differences in learning styles between male and female students as documented in the literature (Karns 2006). Student's field of study (option) did not have significant relationship with their module assignment grade; however, the students with an option in finance had significantly higher course grades in the Principles of Marketing course than those with other options such as Accounting, and Entrepreneurship option. This finding should be verified by looking at a larger sample and in various courses to be generalized.

In conclusion, marketing educators are encouraged to use tools that will motivate students to engage in the marketing process and learn the marketing concepts. If marketing education is to continue to effectively prepare students for employment and life, educators must understand the ways that technology and other educational methodologies inspire students (Clarke III, Flaherty, and Mottner, 2001). Therefore, infusing traditional pedagogy with technological advancements through survey methods and experiments and making the results available to educators can only advance the research on this topic.

REFERENCES

Achenreiner, G. (2001). Marketing Research in the Real World: Are We Teaching Students What They Need to Know? *Marketing Education Review,* 11 (Spring), 15-25.

An, Y., and T. Frick. (2006). Student Perceptions of Asynchronous Computer-mediated Communication in Face-to-Face Courses. *Journal of Computer-Mediated Communications,* 11 (2), article 5.

Berge, Z. and M. Collins. (1993). Computer Conferencing and Online Education. *The Arachnet Electronic Journal on Virtual Culture,* 1 (3), Retrieved September 15, 2007 from http://www.emoderators.com/papers/bergev1n3.html

Clarke III, I., T. Flaherty, and S. Motter. (2001). Student Perceptions of Educational Technology Tools. *Journal of Marketing Education,* 23(3), 169-177.

Close, A., A. Dixit, and N. Malhotra. (2005). Chalkboards to Cybercourses: The Internet and Marketing Education. *Marketing Education Review,* 15 (2), 81-93.

Cluskey, B., M. Elbeck, K.L. Hill, & D. Strupeck (2011). How Students Learn: Improving Teaching Techniques for Business Discipline Courses. *Journal of Instructional Pedagogies*, 6, 1-11.

Grewal, Druv and Michael Levy (2010). *Marketing*. 2nd edition. McGraw-Hill Irwin.

Hannaford, W., R. Erffmeyer, and C. Tomkovick. (2005). Assessing the Value of an Undergraduate Marketing Technology Course: What do Educators Think? *Marketing Education Review,* 15 (1), 67-76.

Harasim L. (1990). Online Education: An Environment for Collaboration and Intellectual Amplification. In L. Harasim (Ed.), *Online Education: Perspectives on a new environment,* (pp. 39-64). New York: Praeger.

Henson, S., P. Kennett, and K. Kennedy. (2003). Web-based Cases in Strategic Marketing. *Journal of Marketing Education* 25 (3), 250-259.
Jaffee, D. (1997). Asynchronous Learning: Technology and Pedagogical Strategy in a Distance-Learning Course. *Technology Sociology,* 25, 262-277.
Karns, G. (2005). An Update of Marketing Student Perceptions of Learning Activities: Structure, Preferences, and Effectiveness. *Journal of Marketing Education,* 27 (2), 163-171.
Karns, G. (2006). Learning Style Differences in the Perceived Effectiveness of Learning Activities. *Journal of Marketing Education,* 28 (1), 56-63.
Kaynama, S. and G. Keesling. (2000). Development of a Web-based Internet Marketing Course. *Journal of Marketing Education,* 22, 84-89.
Krentler, K. A. and L. A. Willis-Flurry (2005). Does Technology Enhance Actual Student Learning? The Case of Online Discussion Boards. *Journal of Education for Business*, 80 (6), 316-321.
Leasure, A., L. Davis, and S. Thievon. (2000). Comparison of Student Outcomes and Preferences in a Traditional vs. World Wide Web Based Baccalaureate Nursing Research Course. *Journal of Nursing Education,* 39 (4), 149-154.
Liebowitz, J., and G. Yaverbaum. (1998). Making Learning Fun: The Use of Web-based Cases. *The Journal of Computer Information Systems,* 39(1): 14.
Malhotra, N. (2002). Integrating Technology in Marketing Education: Perspective for the New Millennium. *Journal of Marketing Education,* 12 (3), 1-5.
Marshall, G. and R. Michaels. (2001). Teaching Selling and Sales Management in the Next Millennium: An Agenda from the AMA Faculty Consortium. *Marketing Education Review,* 11 (1), 1-6.
Newell, S., P. Titus, and J. West. (1996). Investigating the Undergraduate Student Decision-making Process of Selecting a Business Specialization: A Comparison of Marketing and Non-marketing Business Students. *Journal of Marketing Education,* 18, 57-67.
O'Connor, Maggie and Tulay Girard (2006), "Making Principles of Marketing Case Studies Tangible through Interactivity," *Journal of Business and Leadership: Research, Practice, and Teaching*, 2 (2), 374-381.
Pickett, J. (Ed.). (2000). *The American Heritage Dictionary of the English Language* (4th ed.). Boston: American Heritage.
Picciano, A. G. (2002). Beyond Student Perceptions: Issues of Interaction, Presence, and Performance in an Online Course. *Journal of Asynchronous Learning Networks,* 6 (1), 21-40.
Priluck, R. (2004), Web-Assisted Courses for Business Education: An Examination of Two Sections of Principles of Marketing. *Journal of Marketing Education*, 26 (2), 161-173.
Strauss, J., and R. Frost. (1999). Selecting Instructional Technology Media for the Marketing Classroom. *Marketing Education Review,* 9 (1): 11-20.

AN EVALUATIVE CASE STUDY ON PROFESSIONAL COMPETENCY OF PRESERVICE INFORMATION TECHNOLOGY TEACHERS

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ABSTRACT
The purpose of this study is to evaluate preservice Information Technology (IT) teachers' professional competency in the teaching process. The study was designed on the basis of evaluative case study. The participants of the study consisted of seven preservice IT teachers attending the department of Computer Education and Instructional Technologies (CEIT) at the College of Education of the higher education institution in Turkey in the spring semester of the 2008-2009 academic year, one participant researcher and one mentor teacher. In the study, the qualitative research data collection methods such as small-group interviews, observations and field notes were used, while the evaluation forms of the participant researcher and mentor teacher, the reflections of mentor teachers, and the researcher's journals were used as supplementary data sources. Inductive data analysis methods were employed in this study. The findings of the study indicated that the preservice IT teachers were competent in the preparation of instructional materials, in the use of instructional materials and technological tools and in the implementation of assessment and evaluation activities. However, the preservice IT teachers had a low level of competency in the use of technological concepts and in the observation of students' development. The findings of the study were discussed based on the handbook that was published by the MoNE. The research also has implications for future research, IT teachers and IT preservice teachers.
Keywords: Technology integration, Information Technology teacher, preservice teacher, teachers' competencies, professional competencies.

INTRODUCTION
The transformation in information and communication technologies (ICTs) requires students not only to become literate in technology but also become individuals who can adapt themselves to the new and advanced technologies. According to the students' competency with technology (NETS for Students) determined by the International Society for Technology in Education (ISTE, 2007), students are expected to become productive digital people, to effectively learn for a lifetime, to have higher order thinking skills, and to become competent in technology use. In this digital age, the training of individuals who have global learning skills requires the effective and productive integration of technology into the teaching process. Effective technology integration into educational systems does not only mean the acquisition of technology but also is a complex and multidimensional process that includes the teaching curriculum and pedagogy, institutional readiness, teacher competency and long-term financing (Tinio, 2003). In this process, it is emphasized that preservice teachers do not have all the skills necessary for the effective use of technology and for the integration of technology into future classrooms and that they are in need of acquiring the skills necessary especially for the integration of technology into the teaching process (Gülbahar, 2008). In this respect, one of the important variables influencing the integration of technology is the development of related teacher competency (Hew & Brush, 2007; Karal, Aydin & Ursavaş, 2009; Lim, 2007; Lim & Khine, 2006; Ozdemir & Kilic, 2007; Yalın, Karadeniz, & Şahin, 2007).

There are various approaches to the establishment of standards and competency regarding teachers' use of technology and the integration of technology into the teaching process. These approaches fall into three categories: describing national standards, determining the benchmark approach and taking the views and opinions of teacher training experts as the basis (Valcke, Rots, Verbeke & Braak, 2007). One of the best practices regarding the approach to the establishment of national standards is the educational technology standards for teachers defined in the USA within the scope of the National Educational Technology Standards (NETS•T) Project of the International Society for Technology in Education (ISTE). The development of ISTE NETS•T is an important phase for the improvement of teachers' competency in educational technology use on a national basis (Kelly & McAnear, 2002). A number of countries such as Australia, China and England considered the NETS•T standards as the basis for establishing their own standards depending on the benchmark approach for the teachers' educational technology standards and competency.

There is a limitation in establishing standards or competencies regarding teachers' use of technology in the classroom in Turkey (Çoklar & Odabaşı, 2009). In addition, it is seen that teachers' competency in technology use found among the sub-competencies of "Overall Competencies of Teachers" which started in 2002 within the scope of Support to the Basic Education Project, established as a draft in 2004, and put into force in 2008. Parallel to the study on overall competency of teachers, teachers' competency in the fields of teaching in elementary schools with the study on professional competency were put into practice with the approval of Ministry of National Education, on July 25, 2008, number 2391 (Turkish Ministry of National Education [MoNE], 2008). The establishment of generic and professional competency regarding the teaching profession could be said to depend on the views and opinions of teacher education experts. One of the professional abilities determined within the scope of the present study was "Information Technology Teachers' Professional Competency".

Information Technology Teacher and Professional Competency

Information Technology (IT) teachers are thought to be the resource of human force, which is expected to have a pioneering role in the integration of technology into the teaching process, in the training of students who have the necessary technological knowledge and skills and in the development of teachers' competency in technology use (Akkoyunlu, Orhan & Umay, 2005; Black, 2006; Kabakçı, Akbulut & Özoğul, 2009). In a study conducted by Cheng (2009), it was stated that the educational applications of IT teachers working in elementary schools constitute the basis of technology innovation in schools.

In Turkey, since 1980, there have been various studies conducted by MoNE regarding the training of teachers who could have a pioneering role in the use of information and communication technologies in education. Within the scope of these studies, the training of computer formative teachers was one of the important steps for the use of computers in educational environments, for the spread of computer-aided education, and for meeting the need for teachers who would give computer education (Akkoyunlu, 2002; Orhan & Akkoyunlu, 2003). Following this study, within the scope of restructuring of Education Faculties in 1998 by the Turkish Council of Higher Education (CHE, 1998), the departments of Computer and Instructional Technologies (CEIT) were opened in the body of Education Faculties, and it became the duty of these departments to train computer teachers for elementary and secondary school institutions (Akkoyunlu, 2002). In the next developmental phase, Computer Teaching was changed to IT teaching depending on the update of the programs of CEIT department as well as depending on the regulations made on the teacher training programs by CHE in 2006-2007.

Another development for IT Teachers was the development of IT Teachers' professional competency and performance indicators parallel to the determination of generic teacher competency in 2008. These professional competencies included the competence fields of "Designing, planning and organizing the teaching process and environment", "Technological concepts and applications", "Learning-teaching-program", "Following and evaluating the development", "School-family-society relationships and ethical and social issues" and "Professional development". For each competency in these competence fields, performance indicators were determined at three different levels as basic (A1), average (A2) and advanced (A3). The advanced level among these performance indicators covered the average and basic levels, and the average level covered the basic level (MoNE, 2008). It is seen that these competence fields include the fields similar to the technology standards developed for Technology Facilitators and Leaders considered by ISTE as another sharer for the integration of technology within the scope of NETS project in 2008.

In Turkey, a number of studies were conducted regarding the developmental process of IT Teachers. One of these studies was carried out by Orhan and Akkoyunlu (2003) to determine computer formative teachers' profiles and the difficulties they experienced during application. With the training of computer teachers in education faculties first in 1998, various studies have been conducted especially with computer preservice teachers as well as with computer teachers. Among these studies are those carried out to develop a self-efficacy scale for computer teachers (Akkoyunlu, Orhan & Umay, 2005) and to reveal computer preservice teachers' self-efficacy beliefs regarding computer use and to reveal computer teachers' self-efficacy beliefs (Orhan, 2005). Besides these studies, there were other studies conducted to determine the problems experienced by computer teachers in their first-year and in their professional lives (Deryakulu & Olkun, 2007; Kabakçı, Akbulut & Özoğul, 2009; Kıyıcı & Kabakçı, 2006). There are also various other studies carried out to determine the attitudes of computer preservice teachers towards computer-aided education, the problems they experience in the teaching process, and their anxieties regarding the future (Altun & Ateş, 2008; Başarıcı & Ural, 2008). A study conducted to determine the self-efficacies of preservice teachers regarding the dimension of assessment and evaluation in terms of educational technology standards, found out that the preservice IT teachers attending the CEIT department in Turkey felt more competent in technology use for assessment-evaluation purposes than those attending other departments (Çoklar & Odabaşı, 2009). In another study carried out to determine the views of preservice IT teachers attending the CEIT department at Ankara University about their acquisition of "Generic Teacher Competency", it was concluded that the preservice teachers had a higher level of acquisition for the sub-competency of "Planning the Course" and "Preparing the Course Material" in terms of the main competency of the "Teaching and Learning Processes". They had a higher level of acquisition for the sub-competency of "Revising the Teaching-Learning Process Based on the Results" in terms of the main competency of "Monitoring and Evaluating Learning and Evaluation". However they had a lower level of acquisition for the sub-competency of "Determining the Methods and Techniques for Assessment and Evaluation" (Numanoğlu & Bayır, 2009). When studies in related literature are examined, it is seen that research on IT teachers in Turkey focuses generally on preservice teachers. In addition, a review of related literature reveals that there is no research investigating the professional competency of preservice IT teachers who are in the teacher training process.

The IT Teacher is also called technology teacher, computer teacher, educational technology teacher, IT teacher, technology training teacher and ICT teacher depending on the differences in application in several countries. In a study conducted by Nagaran (1989) to determine the educational and professional characteristics of computer teachers working in secondary schools, it was revealed that although computer teachers had adequate education in the field of computer sciences, they did not have enough experience in computer teaching. In another study carried out by Hansen (1990) on Technology Teacher competency, with the organization and update of Technology Teachers' professional competency, the need for the development of new professional competency was emphasized. Similarly, in another study carried out with Technology Education secondary classroom teachers and Technology Teacher Educators, it was found out that cognitive and psychomotor competency especially for beginner Technology Education Teachers helped them use their teaching potentials effectively and that Technology Education Teachers' competency should be enhanced (Newberry, 1992). In another study conducted by Walton-Todd (2006) with IT teachers in the Chicago Public School System, it was found that they were aware of the requirements regarding the national technology skills standards (National Educational Technology Standards-NETS, National Standards for Business Education-NSBE and Secretary's Commission on Achieving Necessary Skills-SCANS) and that they thought their background regarding these skills was sufficient. However, it was concluded that they needed professional development in various subjects to develop their competency. Although research on IT teachers in international literature is limited, it is seen that contrary to studies conducted in Turkey, studies on IT teachers reported in international literature include preservice teachers as well. In addition, these studies also examine IT teachers in terms of professional or technological competency.

Along with the technological developments and the problems experienced in the integration process, it is seen that there are various studies, especially in international literature, conducted to determine the competency of IT teachers. Studies in related literature emphasize that professional competency of IT teachers should be updated and developed (Hansen, 1990; Newberry, 1992; Walton-Todd, 2006). Studies carried out with preservice IT teachers will contribute to the competency-based revision of IT teacher training programs and the development of competency. Because of the significance of this, the purpose of the present study is to evaluate preservice Information Technology (IT) teachers' professional competency in the teaching process. In line with this overall purpose, the following research questions were directed:

- What is the degree of professional competency of preservice IT teachers in terms of the instruction phase?
- What is the degree of professional competency of preservice IT teachers in terms of the evaluation phase?

METHOD

Since the purpose of the present study was to understand in detail the professional competency of preservice IT teachers, considering their situation in the phases of instruction and evaluation of teaching, the study was designed as a case study of the designs of qualitative research methods. As is well known, a case study is defined as a detailed examination of the current events or situations (Yin, 2003) and is generally carried out for three different purposes such as descriptive, interpretive and evaluative (Merriam, 1998). In the present study, since the professional competency of preservice IT teachers in the phases of instruction and evaluation of teaching were first described and interpreted and then evaluated with respect to the professional competency determined by the handbook published by the Turkish Ministry of National Education (MoNE) for IT teachers, the study was designed as an evaluative case study.

Participants
The participants of the present study were seven preservice IT teachers, a participant researcher, a mentor teacher and the members of the validity-reliability committee. In order to keep the participants' identities secret, their names were changed. They all attended voluntarily.

Preservice Information Technology (IT) Teachers: Seven preservice IT teachers were senior students attending the department of Computer Education and Instructional Technologies (CEIT) at the College of Education of the higher education institution in Turkey in the spring semester of the 2008-2009 academic year. Three of these preservice teachers were male and four of them were female students. Within the scope of the Teaching Practice course, the preservice IT teachers participated in applied activities in a state elementary school. The participating preservice teachers in the study (Tamer, Ayten, Meryem, Emine, İsmail, Mehmet and Fahriye) executed their teaching practices in Elementary School A. The participant researcher executed the Teaching Practice course with a total of 14 preservice IT teachers in three different state elementary schools in the 2008-2009 academic year. Among all the groups of teachers, the reason for involving seven preservice IT teachers taking the Teaching Practice course at Elementary School A for this research was the fact that the highest number of students belonged to this group.

Participant Researcher: The researcher is also a faculty member in the CEIT department at the College of Education of the higher education institution in Turkey. The researcher, also the conductor of the present study, had a 10 year teaching experience in the field of computer and instructional technologies and has been teaching the course of Teaching Practice since 2004. In addition, the researcher is experienced in the qualitative research method as a researcher and as an advisor for several related theses and offered the Qualitative Research Methods course at post-graduate level. Within the scope of the present study, the researcher had the responsibilities of a faculty member determined by the "Directive for Preservice Teacher Regarding Teaching Practice in the Educational Institutions of the Ministry of National Education". According to this directive, the duty of the participant researcher as an application faculty member was determined generally as preparing the teacher candidates for application activities and observing and evaluating the teacher candidates together with the mentor teacher (MoNE, 1998). In this respect, the researcher had an insider role since the present study was conducted by the participant researcher within the scope of the course of Teaching Practice. Also, the researcher had an outsider role in line with the purpose of the study during the observation processes in the elementary schools where the researcher attended as a participant observer.

Mentor Teacher: The mentor teacher participating in the study was an IT Formative teacher in the state elementary schools. The mentor teacher was a graduate of the CEIT department at the College of Education of the higher education institution in Turkey. The mentor teacher had a three-year experience as an IT teacher. He has also been the mentor teacher of preservice IT teachers within the scope of the course of Teaching Practice for the last two years. In this respect, he was also experienced as a mentor teacher. Within the scope of the study, the teacher had the responsibilities of a mentor teacher mentioned in the "Directive for Preservice Teachers Regarding Teaching Practice in the Educational Institutions of the Ministry of National Education". According to this directive, the duty of the mentor teacher was generally determined as cooperating with the application faculty member for the execution of the application and guiding and evaluating teacher candidates in the process (MoNE, 1998).

Validity/Reliability Committee: The committee included three members. All of the committee members study in the CEIT department at the College of Education of the different higher education institutions. At the same time, one of the faculty members is a specialist in the field of qualitative research and is teaching the course of qualitative research at the post-graduate level. The other two faculty members have experience in qualitative research via various studies and courses.

Setting
There was only one IT Classroom in Elementary School A where the course of Teaching Practice took place. Figure 1 presents the layout of the IT Classroom in Elementary School A.

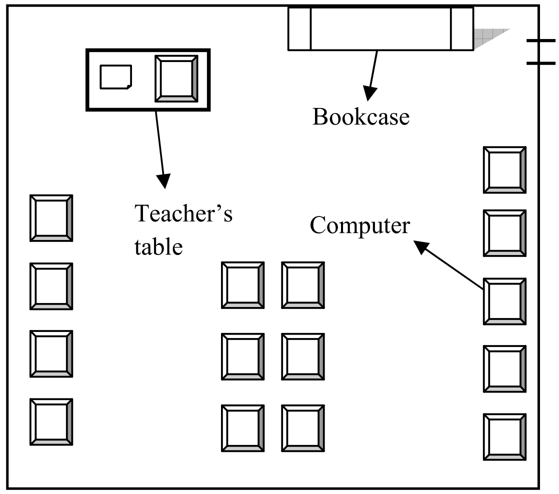


Figure 1: Layout of the IT Classroom in Elementary School A

In the IT Classroom in Elementary School A, there were 15 computers for students and one for the teacher. According to the layout in Figure 1, the students' computers in Elementary School A were put in four rows, two of which were in the middle. In addition, there was no blackboard in the IT classroom in Elementary School A. This IT classroom was about 30 meters square. When the physical features of the elementary school are taken into consideration, it could be stated that the physical environmental organization of the IT classroom had a narrow structure in terms of appropriateness to education.

Data Collection Process and Techniques

Collection of research data from more than one source in case studies helps to obtain a rich and affirmative variety of data (Creswell, 2005; Merriam, 1998; Yin, 2003). Merriam (1998) and Creswell (1994) mention an important point in case studies and suggest simultaneous data collection via different data collection techniques. Therefore, within the scope of the present study, among the qualitative data collection techniques were observation, field notes, small-group interviews, evaluation forms, mentor teacher's reflections and the researcher's journals.

Observation and Field Notes: In the data collection process of the study, for determining the course hours to be observed in line with the purpose of the study, the validity/reliability committee decided to choose the last course teaching among all six course teachings of the preservice IT teachers within the scope of the course of Teaching Practice. The observations regarding the one hour course teaching of the seven preservice teachers guided by the mentor teacher in Elementary School A during the time periods previously determined by consensus were video-recorded by the participant researcher. The video records of these observations in which the researcher participated as a participatory observer constituted the basic data collection sources of the study. During the observations, field notes were taken by the participant researcher. The observations were made in the IT Classrooms, where the preservice teachers taught the courses.

Evaluation Form: The participant researcher and the mentor teacher used the "Teaching Practice Evaluation Form" in order to evaluate the mentor teachers within the scope of the course of Teaching Practice. This evaluation form was prepared in order for the application faculty member and the mentor teacher to evaluate the applications of teacher candidates in the course of Teaching Practice within the scope of the Faculty-School cooperation project (CHE, 1998). Depending on this, this evaluation form is used within the scope of the course of Teaching Practice, which is an obligatory course in all the departments of education faculties. The evaluation form is made up of 46 items in four parts such as subject field and field education (knowledge of subject field and knowledge of field education), the teaching-learning process (planning, instruction process, class management and communication), evaluation and record keeping and other professional competencies. This form was filled out by the mentor teacher for each of the five course hour teachings of the preservice teachers within the scope of the course of Teaching Practice during the academic term and by the participant researcher for the last course hour teaching. Within the scope of the study, certain parts of these evaluation forms were taken as a supplementary data source to determine the development of the preservice teachers in line with the purpose of the study.

Small-group Interviews: Following the courses observed by the participant researcher, small-group interviews were held with the preservice teachers who joined each other's course teachings. The small group interview was held for two purposes. One of these purposes was to evaluate how preservice teachers conducted the phases of instruction and evaluation of the teaching process. The other purpose was to enable each preservice teacher to evaluate himself or herself and other preservice teacher(s) that he or she has observed after course teaching. For this purpose, an interview form including a total of 12 questions, two of which were for individual and group evaluations and 10 of which covered the competency of the phases of instruction and evaluation of the teaching process. Depending on these purposes, small-group interviews were held as an evaluative meeting. The small group interviews were held in the IT Classrooms. These classrooms were preferred because there were no other lessons after the course teaching of the preservice teachers, because they were used under the control of the mentor teacher as IT Teacher. There was also no noise in these classrooms.

Table 1 presents information about the observation records and the small-group interviews.

Table 1: The Data Collection Process in the Present Research

Date	Data Type	Record Type	Record Duration
25.05.2009	Tamer's Lesson Observation	Video Record -1	40 minutes
25.05.2009	Ayten's Lesson Observation	Video Record -2	40 minutes
25.05.2009	Small-group interview with Tamer and Ayten	Audio Record-1	60 minutes
25.05.2009	Meryem's Lesson Observation	Video Record -3	40 minutes
25.05.2009	Emine's Lesson Observation	Video Record -4	40 minutes
25.05.2009	Small group interview with Meryem and Emine	Audio Record-2	67 minutes
28.05.2009	İsmail' s Lesson Observation	Video Record -5	40 minutes
28.05.2009	Mehmet's Lesson Observation	Video Record -6	40 minutes
28.05.2009	Fahriye's Lesson Observation	Video Record -7	40 minutes
28.05.2009	Small group interview with İsmail, Mehmet and Fahriye	Audio Record-3	90 minutes

As can be seen in Table 1, a total of 280-minute video record of observations of the preservice teachers and a 217-minute audio record of the small group interviews were obtained. Besides the small group interviews and the observations that constituted the basic data sources of the study, the journals of the participant researcher and the reflections of the mentor teacher during the research process constituted the supplementary data of the study. For the collection of the research data, written and oral permissions were taken from the principal of Elementary School A, the preservice teachers and the mentor teacher participating in the study.

Data Analysis

As in most qualitative research designs, in case studies, triangulation is carried out to confirm the validity and reliability processes of the study (Patton, 2002). For the analysis of the data obtained in seven different ways such as the records of the small-group interviews, observation records, evaluation forms, reflections of the mentor teacher, and researcher journals, triangulation was made. During data analysis, the themes and dimensions obtained were confirmed by constantly comparing them with the data obtained from different data collection techniques.

For the analysis of the data obtained in the study, the inductive technique was applied. In inductive analysis, first of all, the data were classified with respect to their types to prepare the data for analysis, and a backup of the data was made. Depending on this classification, the data were transcribed and organized. Following this, the accuracy of the transcribed data was checked by each faculty member in the validity/reliability committee. In this way, the data were made ready for analysis. For the analysis of the data, first, all the transcriptions were examined as a whole by the researcher to obtain a general meaning. After this, the data were divided into pieces, and the pieces were coded with names. The codes obtained were combined, and the number of the codes was reduced. In addition, themes and sub-themes were obtained from the codes. The themes and sub-themes were examined independently by each faculty member in the validity/reliability committee, and consensus was reached regarding the themes and sub-themes. The themes and sub-themes obtained were supported with direct quotations from the raw data, the researcher's journal and reflections thus forming the findings (Creswell, 2005;

Gay, Mills & Airasian, 2006; Maxwell, 2005). For the organization and analysis of the data, NVivo 8.0, qualitative data analysis software was applied.

For the interpretation of the findings obtained as a result of data analysis, the competency and indicators presented in the handbook of IT Teacher Professional Competency published by MoNE were used. The competency and indicators in the instruction and evaluation phases in the teaching process and the competency in this handbook were determined by the validity/reliability committee. Depending on this, the competency and indicators presented in Appendix A were taken as the basis for the interpretation of the data obtained. In the handbook of IT Teacher Professional Competency, it also was determined at three different levels as basic (A1 Level), average (A2 Level) and advanced (A3 Level) for performance indicators. At the same time, these indicators`` levels were used for interpreting the data.

FINDINGS

The themes and sub-themes obtained as a result of the analysis of the data collected in line with the purpose of the study are presented in Table 2 below. As can be seen in Table 2, the findings regarding the professional competency of the preservice IT teachers were gathered under two main themes, instruction and evaluation of the teaching process.

Table 2: Themes and Sub-Themes Obtained from Data Analysis

Instruction Phase
Using technological concepts
Using instructional material
Using technological tools
Evaluation Phase
Organizing assessment-evaluation activities
Monitoring student development

Under the first main theme, which was the instruction phase, the sub-themes of using technological concepts, using instructional material and technological tools were obtained. Under the main theme of the evaluation phase of the teaching process, the sub-themes of organizing assessment-evaluation activities and monitoring student development were obtained.

Instruction Phase

The theme of the IT preservice teachers' situations in the instruction phase is presented in Table 2. As can be seen in Table 2, the instruction phase included the sub-themes of using technological concepts, instructional material and technological tools.

<u>Using Technological Concepts</u>: The IT preservice teachers' use of technological concepts in the teaching process included the sub-themes of *the use of Turkish equivalents of concepts* and *correct use of concepts.*

In the study, it was revealed that the IT preservice teachers' use of *Turkish equivalents of concepts* included the dimensions of paying attention to the use of Turkish equivalents of concepts, habitually avoiding use of Turkish equivalents of concepts and taking the language of the program used as the basis. In terms of paying attention to the use of Turkish equivalents of concepts, one of the preservice teachers was observed during his course teaching to explain the concept of "www" and gave its Turkish equivalent saying "*The concept of www is the initials of World Wide Web. And it means geniş alan ağı in Turkish*." (Video Record-6, 28.05.2009). Similarly, it was found out that another preservice teacher, while explaining the Adobe Photoshop program, gave the Turkish equivalents of all the menu buttons during the course saying "*The Magic Wand Tool has a feature like that. This is a magic tool for choosing*" (Video Record-5, 28.05.2009). One of the preservice teachers reported that he paid attention to the use of Turkish equivalents of technological concepts saying "*In my previous lessons, I used e-posta instead of e-mail. I pay attention to issues like this. I try to use the Turkish equivalents of concepts. Or when I ask the students what that is, I tell them to think about its English equivalent and I help them make inferences.*" (Audio Record-1, 25.05.2009). Similarly, another preservice teacher mentioned the same point saying "*I feel I'm competent knowing about such concepts, and I pay attention to using it.*" (Audio Record-2, 25.05.2009). Regarding habitual avoidance of the use of Turkish equivalents of concepts, one of the preservice teachers stated "*For example, today we taught the fourth-grade students. We use the concepts in English, and the children are just listening to us. They don't understand us. Well, we know about all the concepts, and we think they do also. We don't have any problem, but sometimes, we use the concepts in English out of habit.*" (Audio Record-1, 25.05.2009). Regarding the same point, another preservice teacher stated "*I experience problems because in everyday language, we say hard disc, but you should say `sabit disk` in class. We can't get rid of it in* *everyday language at all; to tell the truth, it is difficult for me, I use foreign words.*" (Audio Record-3, 28.05.2009). Similarly, another preservice teacher stated "*It is difficult to translate some words and phrases into Turkish. For example, the Turkish word for 'computer' is 'bilgisayar', and we always use this Turkish word. But, you know the word 'fax', it would be somewhat nonsense to use the phrase 'belge geçer' (document transmitter) because we are not used to it. But we should be using 'e-posta' for `e-mail`. Sometimes we use the correct word but sometimes we don't."* (Audio Record-3, 28.05.2009). Regarding taking the *program language,* for the use of Turkish equivalents of technological concepts as the basis, one of the preservice teachers said, "*Now, all the features of the current software are in English. Well, there are Turkish equivalents of them, but these Turkish equivalents for some tools are really nonsense. It is no use teaching these to children because a child learning Photoshop will learn its English version more easily in this way and will not have any difficulty in the following step. For example, it is better to teach the child 'layer' instead of its Turkish equivalent 'katman'.*" (Audio Record-3, 28.05.2009). This preservice teacher first explained the meaning of 'layer' in Turkish and directly used the word 'layer' in his later course teachings. The preservice teacher stated "*the most basic part and even the backbone of Photoshop and Adobe is the 'layer' …There is a layer, a ground, here, and there are other layers over it. Think about a building*" and added "*There is menu Create A New Layer below the layer component of that area. Can you see it? It is over there. When we click it, we add a new layer.*" (Video Record-5, 28.05.2009). Since the language of the program that this preservice teacher taught was English, during his course teaching, the preservice teacher was observed to use the English names of the program menus which he explained in Turkish (Field Notes, 28.05.2009). In this respect, it could be stated that this preservice teacher confirmed the use of foreign words and phrases appropriate to the program language used for the Turkish equivalents of technological concepts.

In the study, it was revealed that the preservice teachers preferred to explain the concepts with a concept already known in everyday life and to define the concepts for *correct use of technological concepts*. One of the preservice teachers first explained the technological concept in question and then preferred to give an example from everyday life. Fahriye stated, "*It says 'capturing an audio or video on your computer from a video recorder, from a web camera or from another video source'. What do you think 'capturing a video' means? Capturing means choosing and cutting a part from a video film or a video clip. Did you understand? You can choose and cut a certain scene of a film that you like, and you can watch it again later.*" (Video Record-7, 28.05.2009). Mehmet explained the concept of an internet web address by giving an example from everyday life saying "*If you consider Internet Explorer as a postman, you can consider internet addresses as home addresses. Postmen deliver the documents sent to your home addresses. When you enter internet addresses, you can use such internet browsers as Internet Explorer or Mozilla Firefox. These will direct you to the internet addresses.*" (Video Record-6, 28.05.2009). Ayten, while teaching the menu of 'format' in Word, tried to clarify her explanations regarding the technological concepts. She stated "*If we are making changes in written texts, we use the 'font type', and if we are making changes regarding the paragraphs, we use the 'paragraph' option*." (Video Record-2, 25.05.2009).

In the study, the preservice IT teachers were also observed to make certain mistakes in using the technological concepts. Fahriye, who taught how to prepare a presentation in PowerPoint used the word "page" instead of "slide" saying "*Now, in the presentation that we will prepare, I want to include three pages.*" (Video Record-7, 28.05.2009); however, in her later course teaching, she corrected her mistake saying "*For example, I will choose this and prepare a three-slide presentation for you*" (Video Record-7, 28.05.2009). In addition, in her later explanation, Fahriye used the word 'presentation' instead of 'slide' saying "*In the third presentation, Ankara… well, let's put a picture of Ankara.*" (Video Record-7, 28.05.2009). In her following explanation, she corrected this mistake saying "*Ok, now we prepared a very simple three-slide presentation together.*" (Video Record-7, 28.05.2009). Depending on this, it could be stated that Fahriye sometimes experienced problems with the use of such concepts as "presentation, slide and page" in PowerPoint. It was observed that the preservice IT teachers showed effort to use technological concepts correctly yet made some mistakes in explaining and using these concepts and that they tried to correct these mistakes during the teaching process (Field Notes, 28.05.2009).

In the study, depending on the findings regarding the use of technological concepts during the teaching process, it could be stated that the IT teachers were competent, at a basic level (A1 Level), in "using the concepts regarding Information Technologies correctly and appropriately".

Using Instructional Material: The materials used by the preservice IT teachers during the teaching process were examined based on the introduction, presentation and evaluation phases of teaching. Figure 2 below presents the instructional materials that preservice teachers used in the phases of teaching process.

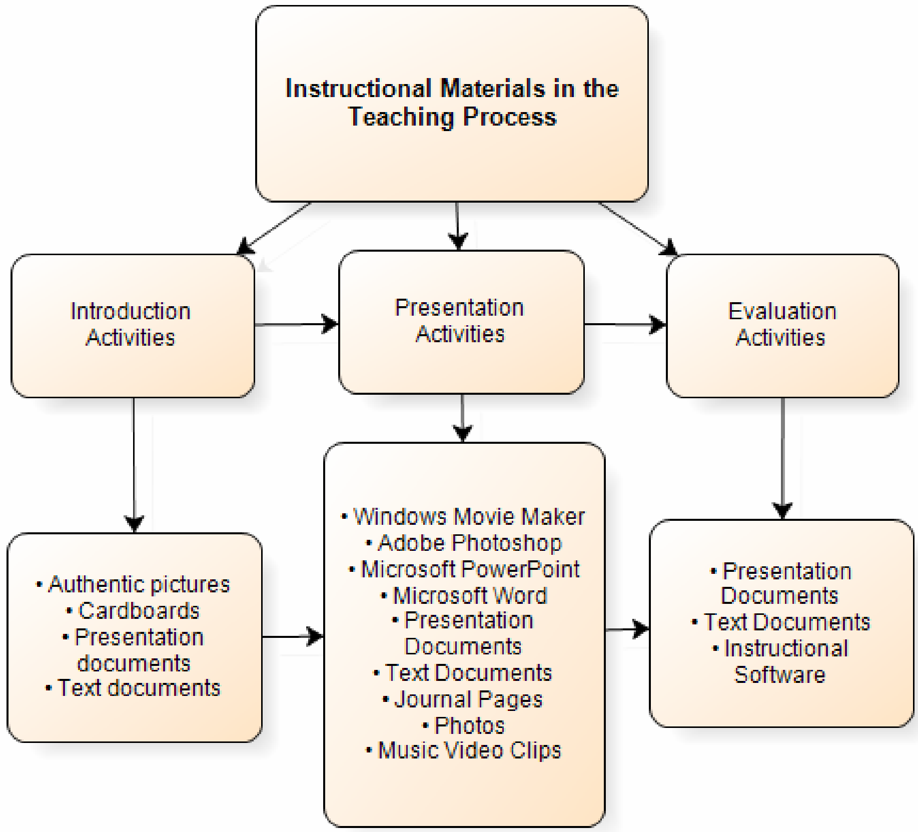


Figure 2: Instructional Materials Used by Preservice Teachers in the Teaching Process

In the study, it was revealed that the preservice teachers used authentic pictures, cardboards, various presentation and text documents as instructional materials during their introduction activities. Fahriye, who taught how to prepare a presentation with Microsoft PowerPoint program, emphasized the importance of visual quality by showing the students the instructional material about seasons, that she prepared as a cardboard at the beginning of the lesson and then by showing them the same content material that she prepared on a cardboard with pictures and written texts (Field Notes, 28.05.2009). Following this, in order to draw attention to a presentation activity prepared in Microsoft PowerPoint, Fahriye showed her students a text document as an introduction activity that she prepared in Microsoft Word including the same texts and showed them the presentation document that she prepared in Microsoft PowerPoint. Regarding this point, Fahriye stated "*Think about a presentation prepared in the same way regarding Ataturk's Principles. This was prepared in Word, and this was a presentation prepared in PowerPoint. A presentation on Ataturk's Principles. And there are pictures again, and there is an animated written text, isn't there? And the scrolling text. Yes, that's it. I wanted to show you that it is more visual in this way.*" (Video Record-7*,* 28.05.2009). Fahriye showed the presentation document that she prepared in Microsoft PowerPoint. Ayten, another preservice teacher who taught the menu of 'format' in Microsoft Word, used the text documents that she prepared as instructional material at the beginning of the lesson. Ayten stated, "*Look, in fact, what is written in this document is the same as what is written in the other one. Ok? Now, you don't need to read what is written. I just want you to have a look at the document. Now, you have seen this document and that one as well. Now, you will tell me the differences between the font types and the paragraphs of these written texts*" (Video Record-2*,* 25.05.2009). In this way, by showing the students two documents, one of which was organized as instructional material with the use of the menu of 'format' in the same program and the other of which was not formatted, the preservice teacher tried to draw attention to the function of the menu of 'format'. Tamer, who used the presentation document that he had prepared with the use of Microsoft PowerPoint program in the introduction activity, tried to draw attention to the function of the menu of 'table' in the Word program with the help of the information in the presentation. Tamer stated, "*There are people with their names, surnames and numbers. The written text is above, and it is put in order as a table below. Well, which one do you think looks more beautiful?*" (Video Record-1*,* 25.05.2009*)*. İsmail, who taught the Adobe Photoshop program, emphasized the function of the program by showing a few authentic pictures prepared with this program saying "*These men* *sat down and tried to do these. All the pictures you will see now were prepared in Photoshop. Well, normally, it is not possible to gather these two.*" (Video Record-5, 28.05.2009). It was observed that instructional materials such as authentic pictures, cardboards, text documents and various presentations were used by the preservice teachers as introduction activities especially for the purpose of drawing students' attention to the subject, establishing a relationship between the subject and the daily life of the subject.

In the study, it was revealed that various application programs, such as Windows Movie Maker, Adobe Photoshop, Microsoft PowerPoint and Microsoft Word, various presentation and text documents, journal pages, photos and music video clips were used by the preservice IT teachers as instructional materials in the phase of presentation activities of the teaching process. The preservice teachers used some of these instructional materials as basic instructional materials and some of them as supplementary instructional materials. Ayten, one of the preservice teachers, taught her students the function of the 'format' menu of the same software via a text document that she prepared by using Microsoft Word. Ayten stated "*Well, I do it from the 'format' menu, friends. Now, I will show you the things in the 'format' menu. Now, friends, I will show you how to do these*" (Video Record-2, 25.05.2009). Ayten, while teaching the function of "columns and drop cap" in the 'format' menu of Microsoft Word, showed two different journal pages. Ayten stated, "*I want to show you two documents. Now, what do you think this page is? Well, it is a journal page, isn't it? What do you see on the page? It says 'title'. Look! Did you see the letter 'M' here, capital letter?*" (Video Record-2, 25.05.2009). Ayten, who used journal pages as supplementary material, tried to show the students everyday use of the function with this option of the program. Meryem, who used Windows Movie Maker as an instructional material, explained the functions of the program and of the menus after helping the students find the location of the program within the Windows operating system and open it. Meryem stated, "*Now, how will we do it? Let's practice together, OK? Let me do it first and then we will do it all together. Now, where is Movie Maker located, friends? Do you know?*" (Video Record-3, 25.05.2009). The preservice teacher, while showing the students how to prepare a video clip by using the program, used the photos and music clips that she previously found via the internet and saved on her computer, as supplementary material. Fahriye, who used Microsoft PowerPoint in the phase of presentation activities, taught preparation of a presentation directly by using the related program. Fahriye stated, "*Now, is there anybody who knows how to open PowerPoint? OK, we found the program and we open it with one-click. This is the overall screen-view of the program. As you see, there is one page, isn't there? In the previous presentations, there were several pages. There were new pages. Now, let's first see how to multiply these pages together with you.*" (Video Record-7, 28.05.2009). Fahriye, while using Microsoft PowerPoint as a basic instructional material, used the photos that she previously saved on her computer, as supplementary instructional material. The preservice teacher stated, "*I wanted to add a photo here. Well, I could use a picture from 'Add' or from a file, or it could be a photo smaller in size, but there was a photo of Eskişehir that I found previously. I will add it. And I added it here.*" (Video Record-7, 28.05.2009). Mehmet, another preservice teacher, stated that he benefited from a Microsoft PowerPoint presentation as a basic instructional material saying "*Today, we will learn the structure and elements of internet addresses. We will benefit from a PowerPoint presentation while teaching the lesson. We will go on in that way*." (Video Record-6, 28.05.2009). Seven of the preservice teachers were observed using a Microsoft PowerPoint presentation as basic instructional material in the phase of presentation activities. In the phase of presentation activities of the teaching process, the preservice IT teachers were observed using application programs, such as Windows Movie Maker, Adobe Photoshop, Microsoft PowerPoint and Microsoft Word and various other presentation documents as basic instructional materials. While four of the preservice teachers used various application software as basic instructional materials, they used journal pages, photos and various text documents as supplementary instructional materials in the teaching process.

As for the evaluation activities, the preservice teachers were observed using instructional software and presentation and text documents as instructional materials. Emine, one of the preservice teachers who taught equipment components and their functions in a computer, asked her students to *match* the statements in the last slide of the presentation document she used in presentation activities *with* the concepts that she numbered. Emine stated, "*Now, we'll match each statement with an appropriate equipment component, OK? Now, we'll call those with a main board as 1, those with screen cards as 2, RAM as 3, the hard disk as 4, the processor as 5, and the sound card as 6. Is it OK?*" (Video Record-4, 25.05.2009). Similarly, Mehmet, who taught the structure of internet addresses and its elements, asked his students 5 questions that he added to the last slide of the presentation document he used as a presentation activity, and in line with the responses of the students, he showed the students the correct answer to the related question. In addition, in the evaluation phase, Mehmet carried out a matching activity by using instructional software that he prepared with Adobe Flash. Mehmet stated, "*Now, you can turn on your computers. Did everybody see the 'extensions' file on the desktop? Well, everybody, look at the board! OK, now, what I want you to do is this, there are internet addresses on the second page. You will match the internet websites with the extensions. OK?*" (Video Record-6, 28.05.2009). For the evaluation activity, Tamer, who taught preparation of a table by using the 'table' menu in Microsoft Word, used a text document that he prepared as a table. Tamer stated, "*Now, here, we set up a table, a sample table. What does it include? There are keyboard keys and their functions. We will write down what the functions of these keys are in Microsoft Word.*" (Video Record-1, 25.05.2009). Following this evaluation activity, Tamer asked the students to prepare a table by using Microsoft Word with the help of the information given in a text document that he prepared. Tamer stated, "*Well, there are four living aquatic beings. All have certain characteristics and a way of nutrition. Here, considering the characteristics here, we will prepare that table, OK? I will show you the table.*" (Video Record-1, 25.05.2009). In addition, it was revealed in the study that the other preservice teachers did not use instructional material in the evaluation phase of teaching. It was found out that the preservice teachers who did not use instructional material for the evaluation activities carried out various other activities by providing students with oral explanations and by using the blackboard.

In the study, it was revealed that the preservice IT teachers used instructional materials that they themselves prepared by hand using paper and cardboard or via computer software and that they also benefitted from the application software they taught during the phases of the teaching process. Parallel to this situation, one of the preservice teachers reported her views about the instructional material saying "*We sometimes exaggerate materials. I don't think everything can be used as a material. In fact, I might not be competent in this subject at all. I don't think everything we show the students or everything we do is not a material. As I said before, I expect it to be a more comprehensive thing."* (Audio Record-1, 25.05.2009). Another preservice teacher reported his thoughts about the instructional material saying "*I believe materials are misunderstood. Paper or cardboard is not always necessary. To me, now, the computer is the best material to use.*" (Audio Record-1, 25.05.2009). Depending on this, it was seen that some of the preservice teachers perceived instructional materials as the representation of an object with cardboard and paper and that some of them perceived instructional materials as any kind of technological tools that support and facilitate the teaching process. In addition, one of the preservice teachers reported her thoughts about the teaching process saying "*Well, we really experience difficulty in this subject, material use, because we first teach the subject and then we want our students to do an activity regarding the material.*" (Audio Record-1, 25.05.2009). The statement of the application faculty member that, "*I believe except for only one preservice teacher, all the others were not successful at all in integrating instructional materials and technologies into the teaching process.*" (Researcher Journal, 28.05.2009) is parallel to the preservice teacher's view above.

The preservice teachers considered material use as a necessity for the teaching process, yet their perceptions of instructional materials were different. This situation is parallel to the fact that some of the preservice teachers used a number and variety of instructional materials in the teaching process and that some of them used the application software they taught as instructional materials. Furthermore, it could be stated that the preservice teachers experienced difficulty in integrating the instructional material into the teaching process. In other words, they experienced some problems in combining the instructional materials with the teaching process.

Depending on the IT preservice teachers' use of application software in the teaching process, it could be stated that they were competent, at a basic level (A1 Level), in "using application software developed for certain purposes", which is among the professional competencies of an IT teacher (Appendix A). In addition, depending on these findings, it could be stated that the preservice teachers were competent, at a basic level (A1 Level), in "preparing effective teaching-learning material", which is among the professional competencies of an IT teacher (Appendix A).

Using Technological Tools: The technological tools used by the IT teachers during the teaching process, as seen in Figure 3, were examined considering the introduction, presentation and evaluation phases of teaching.

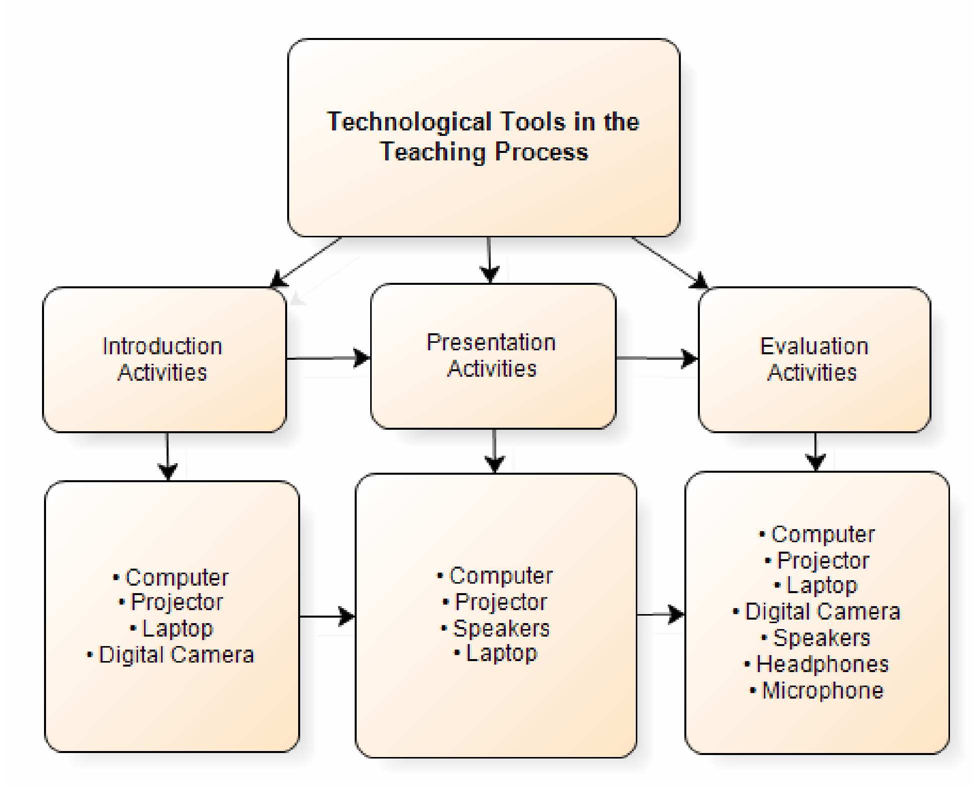


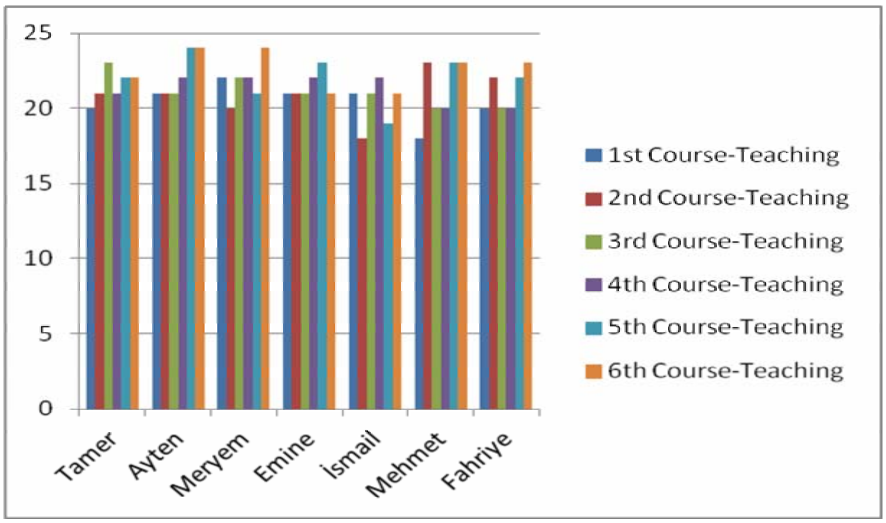
Figure 3: Technological Tools Used by the Preservice Teachers in the Teaching Process

Five of the preservice teachers used a computer and a projector as technological tools in the introduction phase of teaching, two of them used their own laptops, and one of them used a digital camera. Meryem, who taught how to prepare a video-clip with Windows Movie Maker, took the pictures of her students with a digital camera to draw their attention to the function of the software at the beginning of the lesson. Meryem stated, "*Now, first, I will take pictures of you. Well, summer is coming, and you know we'll not be together on holiday and I will miss you so much. I'll have a look at these pictures, OK? Now, children, I will upload these photos onto the computer. Then, I'll look at them one by one. I'll watch them. And, I'll play music in the background. It will be good. Well, how can I do this in a different way? Yes, very good. Do you know Movie Maker Program, friends?*" (Video Record-3, 25.05.2009). Ismail, one of the preservice teachers, used his own laptop, which he connected to the projector before the lesson started, to show the students authentic photos as instructional material in the introduction phase of the teaching process (Field Notes, 28.05.2010). One of the preservice teachers did not use any technological tools in the introduction phase of the teaching process.

It was revealed in the study that one of the preservice teachers used speakers as a technological tool. While the preservice teachers did not generally experience any difficulty in using a computer and a projector, Meryem, a preservice teacher, received help from the mentor teacher in turning on the speakers. The preservice teacher stated, "*Are you ready to watch the video-clip, friends? Sir, the speakers?*" (Video Record-3, 25.05.2009). Ismail, another preservice teacher who taught Adobe Photoshop, used his own laptop to carry out the presentation activities just as he did for the introduction activities (Field Notes, 28.05.2010). It was found out in the study that all the preservice teachers used the teacher's computer and the projector as technological tools in the IT classrooms in the presentation phase of the teaching process.

In the study, it was also revealed that four of the preservice teachers used the teacher's computer and the projector in the IT classrooms to show the students the instructional materials, which they prepared, in the evaluation phase of the teaching process. Meryem, a preservice teacher who used these technological tools, used a microphone, headphones, speakers, and laptop as supplementary technological tools as well as a digital camera for the evaluation activity. Meryem, who carried out a video-clip preparation activity by using Windows Movie Maker as an evaluation activity, transferred the students' pictures that she took with the digital camera and the help of a memory card first into her own laptop computer and then with the help of USB memory into the teacher's desktop computer, with which she carried out the activity. In this activity, the sound to be used in the video-clip was recorded by using the headphones and the microphone of the teacher's computer. This preservice teacher used the speakers and the projector to let the students watch the video-clip in the classroom (Field Notes, 25.05.2009). It was revealed in the study that since all the preservice IT teachers carried out their teachings in the IT classrooms, they benefitted especially from the tools found in these classrooms and that two of the preservice teachers used their own technological tools such as a digital camera and a laptop computer. It was also found out that although the preservice teachers did not experience any difficulty in using technological tools in the introduction, presentation and evaluation phases of the teaching process, they sometimes received support from the mentor teachers. The findings obtained regarding the IT preservice teachers' use of technological tools in the teaching process support the findings regarding the organization of technological tools by the preservice teachers to set up the teaching environment. Depending on these findings, it could be stated that the preservice IT teachers were competent, at a basic level (A1 Level), in "choosing and using technological sources appropriate to the teaching objective", which is among the professional competencies of an IT preservice teacher (Appendix A).

Graphic 1 presents the results of the evaluations based on the sub-dimension items of the teaching process under the teaching-learning process dimension of the "Teaching Practice Evaluation Form". This allowed evaluation of the six course-teachings of the preservice teachers in Elementary School A within the scope of the course of Teaching Practice.



Graphic 1: IT Preservice Teachers' Development in the Instruction Phase

In Graphic 1, it is seen that especially Ayten increasingly developed her competency in executing the teaching process. In addition, it is also seen that Mehmet and Fahriye showed significant development in executing the teaching process especially in their last two course teachings. This situation was also supported by the mentor teacher, who mentioned Fahriye`s last course teaching saying "*Considering her previous course teachings, she was obviously more successful in her last course teaching.*" (Reflection-2, 29.05.2009). In general, it was seen that although the preservice teachers had a low level of competency in executing the teaching process in their first course teachings, they had higher levels of competency in their third and fourth course teachings.

Considering the findings regarding IT preservice teachers' use of technological concepts in the teaching phase, their use of instructional materials, technological tools and the findings, obtained depending on the supplementary data source regarding their development in the teaching phase, it could be stated that the preservice teachers were generally competent, at a basic level, in executing the teaching process.

Evaluation Phase
The theme of the IT preservice teachers' evaluation of the teaching process, as can be seen in Table 2, included such sub-themes as organizing assessment-evaluation activities and monitoring student development.

<u>*Organizing Assessment-Evaluation Activities*</u>: The assessment-evaluation activities carried out by the preservice IT teachers in the teaching process occurred in two groups as individual and group activities. Two of the preservice teachers carried out only individual activities as assessment-evaluation activities, two of them carried out group activities, and two of them carried out both individual activities and group activities. In addition, one of the preservice teachers could not carry out any evaluation activities regarding the evaluation of the teaching

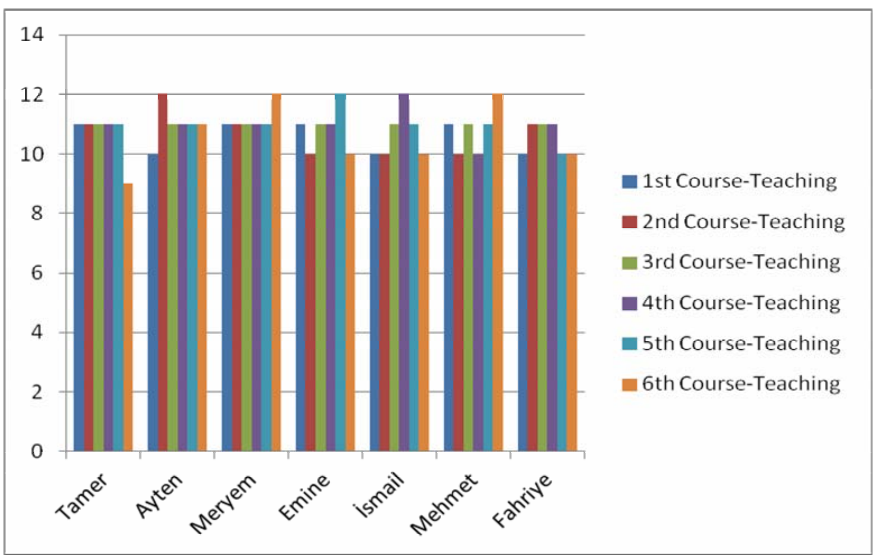
process due to a lack of time. Ayten who taught the 'format" menu of Microsoft Word as an individual evaluation activity, wanted each of the students to make the arrangements, mentioned in the document, by using the 'format' menu of Microsoft Word. She said, "*Now, I want you to turn on your computers and to carry out the criteria I will give you. I want you to change the font type as Verdana, the font size as 12, its color as black, and the space between lines as 1.5. Open a Word document from the class folder, and it should include a written text.*" (Video Record-2, 25.05.2009). Mehmet, prepared instructional software as a different individual evaluation activity, by using the Flash program, and uploaded it on the students' computers before the lesson. In the evaluation phase of the teaching process, he first wanted the students to open this file on their computers. Later, he explained how they could carry out the activity saying, "*Now, you can turn on your computers. Can everybody see the extensions file on their desktops? Yes, everybody look at the blackboard. OK, now, what I want you to do is see that there are internet addresses on the second page; you will match the internet websites with the extensions, OK?"* (Video Record-6, 28.05.2009).

Meryem, who carried out a group evaluation as an assessment-evaluation activity, first taught the subject and then carried out the evaluation activity. She stated, "*Now, we'll do our job. Are you ready? Ready to prepare a video clip? Turn off the monitors; we will do it all together.*" (Video Record-3, 25.05.2009). Meryem, who taught how to prepare a video clip with Windows Movie Maker, first gave a role of a 'player' to all the students in the group activity as an assessment-evaluation activity, and then chose three students for duties such as that of a producer and responsibilities for the generics, sound and titles. She asked the student who was chosen as a producer to take several pictures with the digital camera. Following this, she, as a director, uploaded these photos on to the computer, and the student, who was the producer, transferred these photos into the film strip of Windows Movie Maker. After this, the student responsible for the generics sat in front of the computer and added titles and animations in to the video clip, and the student responsible for the sound recorded the sound, uploaded it on the computer and then transferred it into the film strip. As for the student responsible for titles, the student added a title into the video clip, animated this title, and added it to the film strip. Finally, Meryem, as director, made the necessary arrangements and asked the whole class to watch the video clip (Field Notes, 25.05.2009*)*. Emine who carried out a group activity for evaluation used an evaluation activity that she prepared on a presentation activity and stated "*Now, 3,4,5,6, OK? Now, we'll match each statement with the correct equipment part, OK? We'll call the main board as 1, the screen card as 2, RAM as 3, hard disc as 4, processor as 5 and sound card as 6, OK?*" (Video Record-4, 25.05.2009). Later, she helps the students she chose do the matching correctly for each question by making explanations for them. Similarly, another preservice teacher who carried out a group activity as an evaluation activity asked the students she chose for the evaluation activity that she prepared on a presentation document to respond to each question. In this process, the preservice teacher made explanations regarding the related questions following the responses of the students and helped the students understand the subject better (Field Notes, 25.05.2009).

Tamer who carried out both individual and group activity as an assessment-evaluation activity used a material that he prepared as a table on a text document as the first evaluation activity. He asked the students to write down the functions of the keyboard keys, found in the first column, in the second column (Field Notes, 25.05.2009). For this activity, Tamer, who carried out a group activity, stated "*Now, the friend I choose will say the function of the key and come and write it down here.*" (Video Record-1, 25.05.2009). In this way, he showed the students a sample table prepared with Microsoft Word parallel to the subject before the individual evaluation and prepared an environment for transition to the individual evaluation. Following this activity, he showed the students the materials that he prepared as two different text documents for individual evaluation. He used the features of the first text document and asked the students to prepare a table in the second document. He stated "*Considering the features here, we'll prepare that table, OK?*" (Video Record-1, 25.05.2009). For this individual evaluation activity, he made certain arrangements to help students understand the directives of the activity and showed both Word documents on the screen at the same time. It was found out that he made effective use of technology in order to show the product he prepared for the individual evaluation activity (Field Notes, 25.05.2009). In the evaluation phase of the teaching process, the preservice teachers who carried out a group activity as an assessment-evaluation activity used technology more effectively, while those who carried out an individual activity used technology less. Depending on this finding, it could be stated that the preservice teachers were competent, at a basic level (A1 Level), in "assessing and evaluating information technology learning", which was among the professional competencies of an IT teacher (Appendix A).

Monitoring Student Development: The way the preservice IT teachers followed to monitor the students in the process of evaluation of teaching differed with respect to the individual or group activities the preservice teachers carried out as an assessment-evaluation activity. One of the preservice teachers who carried out individual evaluation reported that the students could start the activity saying "*Children, you'll do this and then when you finish, tell me.*" (Video Record-2, 25.05.2009). In this way, all the preservice teachers who carried out an individual evaluation activity in the teaching process, walked around the classroom and observed the students at their own computer screens. In this process, the preservice teachers made explanations, for the students who experienced difficulty in doing the activity or for those who did the activity wrongly, and tried to monitor the students' development. Ayten, who taught the 'format' menu of Microsoft Word, started the individual evaluation activity saying "*Now, I want to see all you did in a single place. Click on the related option for this. When you are done tell me that you have finished.*" (Video Record-2, 25.05.2009). In this process, she helped the students complete the activity by monitoring them via the option of "show format" in the 'format' menu. She stated "*Line-space is 1.5. You'll make a line-space of 1.5.*" (Video Record-2, 25.05.2009). Thus, it was revealed that this preservice teacher, who carried out an individual evaluation activity, benefited from the related feature of the application software to monitor the students in the evaluation process. Mehmet, who carried out a group activity with PowerPoint presentation in the evaluation process, showed the correct answer for each of the evaluation questions by using the presentation after each of the students' answers. In this way he helped the other students evaluate themselves (Field Notes, 28.05.2009). It was revealed in the study that generally, the preservice teachers who carried out an individual evaluation activity walked around the classroom and monitored their students' participation in the activity. As for the group activities, it was found that the preservice teachers monitored students' participation in the activity on the teacher's computer and helped them complete the activity. In addition, the preservice teachers who carried out a group activity in the evaluation process projected the screen by using the projector and enabled all of the students to see how the students the preservice teacher had chosen carried out the activity. One of the preservice teachers who carried out an individual activity projected the results with the projector from the teacher's computer after all the students completed the activity. In this way, the preservice teacher made it possible for all the students to see the correct answers and to evaluate themselves. In addition, only one of the preservice teachers who carried out an individual evaluation activity benefitted from technology to observe students' development. Depending on this finding, it could be stated that the preservice IT teachers were competent, at a basic level (A1 Level), in "Assessing and evaluating information technology learning", which was among the professional competencies of an IT teacher (Appendix A).

Graphic 2 presents the evaluation results based on the items of the evaluation and record-keeping dimension of the "Teaching Practice Evaluation Form". This allowed evaluation of the six course teachings of the preservice teachers within the scope of the course of Teaching Practice in Elementary School A.



Graphic 2: Development of the IT Preservice Teachers' Evaluation of the Teaching Process

As can be seen in Graphic 2, it is revealed that Meryem and Mehmet showed an increase in their development in evaluation of the teaching process in their last course teachings. In general, it was seen that the preservice teachers showed a decrease in their evaluation of the teaching process in their last course teachings.

Considering the findings obtained, regarding the IT preservice teachers' development in evaluation of the teaching process, depending on the supplementary data source and on their monitoring student development and their organizing the assessment-evaluation activities in the phase of evaluation of the teaching process, it could be stated that the preservice teachers generally had a low level of competency in evaluation of the teaching process.

DISCUSSION

It was found out that the preservice IT teachers were, at a basic level, competent in terms of the following professional competencies of an IT teacher:

- Preparing-effective teaching-learning material
- Choosing and using technological sources appropriate to the teaching objective
- Using application software prepared for certain purposes
- Assessing and evaluating Information Technology learning
- Using concepts related to Information Technologies correctly and appropriately

In addition, the preservice teachers had a low level of competency in terms of the following professional competencies of an IT Teacher:

- Developing and applying basic maintenance strategies for software, equipment and network systems.
- Assessing and evaluating learning by using information technologies

The findings obtained in this study are contrary to the findings of a study carried out by Numanoğlu and Bayır (2009) with preservice IT teachers attending another higher education institution, that "preservice teachers have a higher level of competency in preparing instructional material". It could be stated that this difference is due to the fact that the preservice teachers were attending different higher education institutions. The undergraduate Program of Computer Education and Instructional Technologies in Turkey is a program determined by the Council of Higher Education and applied in all universities. In other words, the curriculum applied in higher education institutions where IT teachers are trained has a standard structure. Therefore, the fact that the IT preservice teachers' competency differed with respect to their higher education institution is dependent on several factors such as the number of faculty members in the institutions, the specialization fields of the faculty members, the facilities and the limitations of the institutions.

The findings obtained in the study that the preservice teachers had a low level of competency in "measuring and evaluating learning by using Information Technologies" differed from the findings of a study conducted by Çoklar and Odabaşı (2009) that the preservice teachers attending the Department of Computer and Instructional Technologies found themselves more competent in using technology for assessment-evaluation purposes compared to the other preservice teachers in other departments. Depending on this, it could be stated that although the preservice IT teachers considered themselves more competent in technology use for assessment-evaluation purposes when compared to other preservice teachers attending other teacher-training departments, they did not have enough experience to transfer their knowledge into the teaching process.

In the study, it was found out that the preservice IT teachers were competent at a basic level in the instruction phase, but they had a low level of competency in evaluation. Regarding this finding, it could be stated that this situation occurred because the preservice IT teachers were in the process of preservice training and because they focused more on the transfer of content within this process. In addition, it is reported in related literature that the course of Information Technologies is given in institutions as a one hour course on a weekly basis and that accordingly, teachers experience various problems in transferring content in the teaching process and in carrying out assessment-evaluation activities (Altun & Ateş, 2008; Deryakulu & Olkun, 2007; Kabakçı, Akbulut & Özoğul, 2009; Kıyıcı & Kabakçı, 2006). It could be stated that the low level of preservice teachers' competency in the evaluation process in the present study could result from the fact that the number of course hours of the course of Information Technologies is limited and from the fact that the preservice teachers focused more on transferring content into the teaching process.

Studies reported in related literature show that problems experienced by teachers in their early years of teaching regarding class management, preparation of a teaching plan, transfer of content, and organization of instructional activities negatively influenced teachers' effective use of technology (Clausen, 2007; Kabakçı, Akbulut & Özoğul, 2009). Furthermore, the increasing knowledge and skills of new teachers regarding technology use and content teaching in the teaching process in their early years of teaching also influence their gaining experience in benefitting effectively from technology in the teaching process (Clausen, 2007). In this respect, it could be stated that the IT preservice teachers' competency in phases of instruction and evaluation of the teaching process will develop depending on their increasing knowledge and skills regarding their technology use and professional experience.

CONCLUSION

The present study, which was designed as a case study aimed at determining the professional competency of a group of preservice IT teachers who were attending the CEIT department at the College of Education of the higher education institution in Turkey, considered the phases of their instruction and evaluated the teaching process. The results obtained in the present study are important for the development and improvement of IT Teacher Training programs depending on the professional competency of IT preservice teachers.

It is reported in related literature that among the primary critical problems regarding technology based education are such issues as the recruitment of student teachers into teacher education programs and insufficient quantities of qualified technology education teachers (Wicklein, 2005). Therefore, considering the findings obtained in the present study, the improvement of the IT Teacher Training programs in Turkey, in terms of professional competency of an IT Teacher, will contribute to the training of qualified IT teachers. However, because the curriculums applied in these undergraduate programs are determined by the Council of Higher Education in Turkey and because these curriculums are compulsory in higher education institutions, the program could be enriched with optional courses. Therefore, supporting the undergraduate programs of CEIT with optional applied courses regarding the development of such competency for carrying out advanced technology applications, benefitting from information technologies for assessment and evaluation purposes and doing planning appropriate to teaching could contribute to the development of the professional competency of IT preservice teachers.

Effective technology integration requires teachers not only to use their knowledge about technology use in the teaching-learning process but also to combine their content knowledge with their technology and pedagogy knowledge (Harris, Mishra & Koehler; 2009; Mishra & Koehler; 2006). Depending on this, helping preservice teachers gain technological and pedagogical content knowledge in the process of preservice education is quite important for effective technology integration. In addition, since their content knowledge is technology education, preservice IT teachers are different from other preservice teachers studying in the fields of mathematics, science, social sciences and pre-school education. In other words, helping preservice IT teachers acquire information and skills regarding the use of their knowledge about technology and pedagogy together with the process of teaching technology in the process of teaching training will contribute to their acquisition of technology integration skills. Furthermore, in the process of technological teacher education, conducting studies on field-based reflective practice appropriate to the context and content of the curriculum that preservice teachers will apply and they provides them with professional self-awareness for technology integration (Choy, Wong & Gao, 2009; Hansen, 1995; Hansen, 1993). Therefore, the content of the teaching training program applied for preservice IT teachers and the courses in the program could be rearranged and updated in a way to help preservice teachers gain technological and pedagogical content knowledge via reflective practice.

The revision of the IT teacher training program in line with the needs for technology integration and professional competency of an IT Teacher could help IT teachers, who are expected to act as the leaders of technology integration, become competent in doing technology leadership and technology counseling, guiding other teachers from other fields in terms of using technologies, determining the technological needs of the institution by being aware of the current technologies and in training individuals who can effectively use information and communication technologies.

The present study was carried out with a group of preservice IT teachers attending the College of Education of the higher education institution in Turkey. Depending on this, studies to be conducted with qualitative and quantitative research methods for the purpose of determining the professional competency that preservice IT teachers in other higher education institutions have, could contribute to the generalization of the findings obtained in the present study. In addition, studies of a follow-up type that aim at determining the professional competency of preservice IT teachers in their early years of teaching are likely to reveal findings regarding the development of IT preservice teachers' professional competency. Moreover, applied studies of an action research type to be carried out with preservice IT teachers could also contribute to the development of the professional competency of preservice teachers.

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REFERENCES

Akkoyunlu, B. (2002). Educational technology in Turkey: Past, present and future. *Educational Media International*, *39* (2), 164-174.
Akkoyunlu, B., Orhan, F. & Umay, A. (2005). Bilgisayar öğretmenleri için bilgisayar öğretmenliği öz-yeterlik ölçeği geliştirme çalışması [A study on developing teacher self efficacy scale for computer teachers]. *Hacettepe University Journal of Education, 29*, 1-8.
Altun, E., & Ateş, A. (2008). Bilgisayar ve öğretim teknolojileri öğretmen adaylarının sorunları ve geleceğe yönelik kaygıları [The problems and future concerns of computer and instructional technologies preservice teachers]. *Elementary Education Online*, *7*(3), 680-692.
Başarıcı, R. & Ural, A. (2008). Bilgisayar öğretmen adaylarının bilgisayar destekli eğitime yönelik tutumları [Attitudes of computer teacher candidates towards computer-aided education]. *International Online Journal of Educational Sciences*, *1*(1), 165-176.
Black, V. R. (2006). *Self-perception of transformational leadership practices of middle and high school computer technology teachers in an urban public school environment*. Unpublished doctoral dissertation, University of Bridgeport.
Cheng, Y. (2009). *What is it like to be a computer teacher?* Unpublished doctoral dissertation, University of Illiniois, ADB: Illiniois, Urbana.
Choy, D., Wong, A. F. L., & Gao, P. (2009). Student teachers' intentions and actions on integrating technology into their classrooms during student teaching: A Singapore study. *Journal of Research on Technology in Education-JRTE, 42*(2), 175–195.
Clausen, J. M. (2007). Beginning teachers' technology use: First-year teacher development and the institutional context's affect on new teachers' instructional technology use with students, *Journal of Research on Technology in Education*, *35*(3), 245-261.
Council of Higher Education ([CHE], 1998). *Fakülte-okul işbirliği [Faculty-school cooperation].* Yükseköğretim Kurulu Milli Eğitimi Geliştirme Projesi, Ankara, Turkey.
Creswell, J. W. (1994). *Research design: Qualitative & quantitative approaches*. Thousand Oaks, CA: Sage.
Creswell, J.W. (2005). *Educational research: Planning, conducting and evaluating quantitative and qualitative research* (2nd edition). Upper Saddle River, N.J.: Pearson Merrill Prentice Hall.
Çoklar, A. N., & Odabaşı, H. F. (2009). Eğitim teknolojisi standartları açısından öğretmen adaylarının ölçme ve değerlendirme özyeterliklerinin belirlenmesi [Determining the Assessment and Evaluation Self-Efficacies of Teacher Candidates Regarding Education Technology Standards]. *Selçuk Üniversitesi Ahmet Keleşoğlu Eğitim Fakültesi Dergisi*, *27*, 1-16.
Deryakulu, D., & Olkun, S. (2007). Analysis of computer teachers' online discussion forum messages about their occupational problems. *Educational Technology & Society*, *10* (4), 131-142.
Gay, L. R., Mills, G. E., & Airasian, P. (2006). *Educational research: Competencies for analysis and applications* (8th edition). Upper Saddle River, N.J.: Pearson Merrill Prentice Hall.
Gülbahar, Y. (2008). Improving the technology integration skills of prospective teachers through practice: a case study. *The Turkish Online Journal of Educational Technology – TOJET*, *7*(4), 71-81.
Hansen, P. B. (1990). *Principles of technology teacher competency profile*. Unpublished master thesis, University of Alberta, Edmonton.
Hansen, R. E. (1993). A technological teacher education program planning model. *Journal of Technology Education, 5*(1), 21-28.
Hansen, R. E. (1995). Five principles for guiding curriculum development practice: The case of technological teacher education. *Journal of Industrial Teacher Education*, *32*(2), 30-50.
Harris, J., Mishra, P., & Koehler, M. (2009). Teachers' technological pedagogical content knowledge and learning activity types: Curriculum-based technology integration reframed. *Journal of Research on Technology in Education-JRTE*, *41*(4), 393–416.
Hew, K. F., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: current knowledge gaps and recommendations for future research. *Education Technology Research &. Development*, *55*, 223–252.
International Society for Technology in Education ([ISTE], 2007). The ISTE National Educational Technology Standards (NETS•S) and Performance Indicators for Students. Retrieved from http://www.iste.org
Kabakçı, I., Akbulut, Y., & Özoğul, P. (2009). Perceived problems of computer teachers. *Eurasian Journal of Educational Research*, *34*, 199-214.
Karal, H. Aydin, Y., & Ursavaş, Ö. F. (2009). Struggles for integration of the technologies into learning environment in Turkey. *International Journal of Social Sciences*, *4*(2), 104-111.
Kelly, M. G., & McAnear, A. (Eds.). (2002). *National educational technology standards for teachers preparing teachers to use technology.* Eugene, OR: International Society for Technology in Education.
Kıyıcı, M., & Kabakçı, I. (2006). BÖTE Bölümü Mezunu Bilgisayar Öğretmenlerinin İlk Çalışma Yıllarında Karşılaştıkları Sorunların Belirlenmesi [Determining the Problems Experienced by First-Year Computer

Teachers], *Proceedings of 6th International Educational Technology Conference*, Volume II, Eastern Mediterranean University, Famagusta, North Cyprus, 1137-1148.
Lim, C. P. (2007). Effective integration of ICT in Singapore schools: Pedagogical and policy implications. *Education Technology Research &. Development*, *55*(1), 83-116.
Lim, C. P., & Khine, M. (2006). Managing teachers' barriers to ICT integration in Singapore schools. *Journal of Technology and Teacher Education*, *14*(1), 97-125.
Maxwell, J. A. (2005). *Qualitative research design: An interactive approach* (2nd edition). Thousand Oaks, CA: Sage Publications.
Merriam, S. (1998). *Qualitative research and case study applications in education.* San Francisco: Jossey-Bass.
Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for integrating technology in teacher knowledge. *Teachers College Record, 108*(6), 1017–1054.
Nagaran, M. (1989). *The background and qualifications of computer science teachers in San Diego County.* Unpublished doctoral dissertation. United States International University.
Newberry, C. F. (1992). *Identification and verification of cognitive and psychomotor competencies essential for beginning Technology Education teachers in secondary education programs.* Unpublished doctoral dissertation, University of New Mexico.
Numanoğlu, G., & Bayır, Ş. (2009). Bilgisayar öğretmen adaylarının öğretmenlik mesleği genel yeterliklerine ilişkin görüşleri [The opinions of computer teacher trainees on generic teacher competencies], *Ahi Evran Üniversitesi Kırşehir Eğitim Fakültesi Dergisi*, *10*(1), 197-212.
Orhan, F. (2005). Bilgisayar öğretmen adaylarının, bilgisayar kullanma öz yeterlik inancı ile bilgisayar öğretmenliği öz yeterlik inancı üzerine bir çalışma [A study on the relationship between initial teacher training students' perceived computer self-efficacy and their teacher self-efficacy as a candidate computer teachers]. *Eurasian Journal of Educational Research, 21*, 173 – 186.
Orhan, F. & Akkoyunlu, B. (2003). Eğitici bilgisayar formatör (master) öğretmenlerin profilleri ve uygulamada karşılaştıkları güçlüklere ilişkin görüşleri [Profiles and opinions of the computer formative teachers' on the difficulties they have faced during the applications]. *Hacettepe University Journal of Education*, *29*, 1-8.
Ozdemir, S., & Kilic, E. (2007). Integrating information and communication technologies in the Turkish primary school system. *British Journal of Educational Technology*, *38* (5), 907-916.
Patton, M. Q. (2002). *Qualitative evaluation and research methods* (3rd edition). Thousand Oaks, CA: Sage Publications, Inc.
Tinio, V. (2003). *ICT in education*. ICT for Development, United Nations Development Programme, New York.
Turkish Ministry of National Education. ([MoNE], 1998). Öğretmen Adaylarının Milli Eğitim Bakanlığına Bağlı Eğitim Öğretim Kurumlarında Yapacakları Öğretmenlik Uygulamasına İlişkin Yönerge [Directive for Preservice Teachers Regarding Teaching Practice in the Educational Institutions of the Ministry of National Education]. *T.C. Milli Eğitim Bakanlığı Tebliğler Dergisi*, *2493.* Retrieved from http://tkb.meb.gov.tr
Turkish Ministry of National Education. ([MoNE], 2008). *Öğretmen yeterlikleri: öğretmenlik mesleği genel ve özel alan yeterlikleri [Teacher competencies: generic and professional competencies]*. Devlet Kitapları Müdürlüğü, Ankara, Turkey.
Valcke, M., Rots, I., Verbeke, M., & Braak, J. (2007). ICT teacher training: Evaluation of the curriculum and training approach in Flanders. *Teaching and Teacher Education, 23*(6), 795–808.
Walton-Todd, L. B. (2006). *Information technology teachers' perception of implementing the national education technology standards*. Unpublished doctoral dissertation, Colorado State University.
Wicklein, R. C. (2005). Critical issues and problems in technology education. *The Technology Teacher, 64* (4), 6-9.
Yalın, H. İ., Karadeniz, Ş., & Şahin, S. (2007). Barriers to information and communication technologies integration into elementary schools in Turkey. *Journal of Applied Sciences, 7*(24), 4036-4039.
Yin, R. (2003). *Case study research: design and methods* (3rd Edition). London: Sage Publications, Inc.

Appendix A: IT Teachers' Professional Competencies and Performance Indicators in the Study

COMPETENCY	Choosing and using technological sources appropriate to the teaching goals	
PERFORMANCE INDICATORS		
A1 LEVEL	A2 LEVEL	A3 LEVEL
• Evaluating, choosing and using equipment types to support learning. • Evaluating, choosing and using the software developed for teaching-learning purposes.	• During the planning process, benefitting from the findings of research on the use of technology in teaching-learning environments and from the experiences of other information technology teachers. • Evaluating the technological sources present in the school environment and organizing educational activities based on these sources.	Guiding colleagues for choosing and using the technological sources appropriate to the teaching goals.
COMPETENCY	Using concepts related to Information technologies correctly and appropriately	
PERFORMANCE INDICATORS		
A1 LEVEL	A2 LEVEL	A3 LEVEL
• Using basic concepts related to information technologies in written and oral communication correctly and appropriately. • Recognizing Turkish equivalences of technological terms and paying attention to using these.	• Designing activities related to learners' correct and appropriate use of concepts regarding information technologies. • Helping learners acquire the habit of using Turkish equivalences of technological terms.	• Guiding other teachers for the correct and appropriate use of concepts regarding information technologies. • Researching Turkish equivalences of technological terms; contributing to translating the terms into Turkish that have no equivalence in Turkish; and generalizing the use of these terms.
COMPETENCY	Using application software prepared for certain purposes	
PERFORMANCE INDICATORS		
A1 LEVEL	A2 LEVEL	A3 LEVEL
• Using ready databases and web design programs with certain drafts, electronic charts, desktop publishing with ready templates, presentation and word processor. • Benefitting from information technologies for such purposes as communication, problem solving and information sharing.	• Developing data collection, data classification and data verification by using information technologies to help students prepare projects.	• Using such application programs at an advanced level as animation, graphics and desktop publication. • Developing effective methods appropriate to the purpose by automating frequently-used processes such as macros, templates in counting programs and control methods.
COMPETENCY	Preparing effective teaching-learning materials	
PERFORMANCE INDICATORS		
A1 LEVEL	A2 LEVEL	A3 LEVEL
• Preparing teaching-learning materials by using information technologies.	• Developing learning materials by using desktop publication programs including ready	• Developing materials – that will enrich learning activities – by using programs developed

• Enriching the materials – that are used in the teaching process – by evaluating them with respect to their appropriateness to the design principles, practicality, updatedness, and effectiveness.	templates, website design, electronic charts, database, and word processor. • Helping learners share their studies by using different environments such as e-mail, poster, forum, exhibitions, network and web.	specifically for preparing educational software, web design, graphics and animation. • Preparing web-aided instructional materials by using different coding systems effectively.
COMPETENCY	Assessing and evaluating Information Technology learning	
PERFORMANCE INDICATORS		
A1 LEVEL	A2 LEVEL	A3 LEVEL
• Defining the products that students will develop by using information technologies; and defining measurement-evaluation tools and methods to be used for the evaluation these products. • Providing students with feedback regarding the purposes, tools, methods and results of measurement and evaluation.	• Measuring learners' gains in technology use and providing them with opportunities to share these experiences with their teachers, peers and others. • Using the measurement and evaluation tools developed by testing their validity and reliability. • Informing the teachers, students, and their parents about the purposes, tools, methods and results of measurement and evaluation.	• Guiding the applications of individual and peer evaluation to allow learners to criticize the technological products – they have developed – and the preparation processes for these products. • Reorganizing the teaching strategies, learning environment and measurement and evaluation methods in line with the results of evaluation. • According to the results of evaluation, guiding students and their parents for determining new learning goals.
COMPETENCY	Measuring and evaluating learning by using information technologies	
PERFORMANCE INDICATORS		
A1 LEVEL	A2 LEVEL	A3 LEVEL
• Benefitting from information technologies to measure learners' learning and to observe and report their development. • Benefitting from information technologies to collect qualitative and quantitative data that will help evaluate the results of measurement.	• Developing various electronic evaluation methods to evaluate individual product files and products. • Using appropriate communication tools such as e-mail and web-based sources to provide learners with feedback regarding their achievements.	• Developing and using criteria that measure students' processes that they developed with technology use. • Benefitting from information technologies to analyze group performance and compare and share the findings with the data of other groups.

AN EXAMINATION OF PREDICTOR VARIABLES FOR PROBLEMATIC INTERNET USE

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ABSTRACT
This study examines problematic Internet use among university students in terms of gender, while also gauging the impact of personality traits, life satisfaction and loneliness variables on problematic Internet use. A total of 411 university students studying Education in North Cyprus participated in the study. The participants were selected using quota sampling; 64 percent (n=263) of the participants were female and 36 percent (n=148) were male. Data was collected using the Online Cognition Scale (OCS), UCLA Loneliness Scale, Life Satisfaction Scale (LSS) and Eysenck Personality Questionnaire Revised-Abbreviated Form (EPQR-A), and was analysed using "t-Test" and multiple regression methods. Findings suggest that problematic Internet use shows significant variation depending on gender. Predictor variables (neuroticism, extraversion, psychoticism, lie, life satisfaction, and loneliness) meaningfully predict problematic Internet use.
Keywords: Problematic Internet use, personality traits, life satisfaction, loneliness, university students

INTRODUCTION

With recent technological developments, computers and the Internet have become crucial communication channels. While making life easier, however, these technologies have brought with them new risks. For over a decade, problematic Internet use has attracted unparalleled attention and has been widely researched. Researchers have sought to better understand problematic Internet use (Eldeleklioğlu, 2008; Griffiths, 1996; 1997; Kaltiala-Heino, Lintonen, Rimpela, 2004; Kim, LaRose & Peng, 2009; Morahan-Martin, 2007, 2008; Tahiroglu, Çelik, Uzel, Özcan & Avcı, 2008; Özcan, 2004, 2006; Özcan & Buzlu, 2005; Yellowlees, & Marks, 2007; Young & Rogers, 1998; and Widyanto & Griffiths, 2007).

Even though problematic Internet use is often labelled as a type of pathological behaviour, healthy people may also suffer from its symptoms. It was suggested that problematic Internet use as well as negative cognitive, emotional and behavioural consequences are caused by multidimensional interpersonal relationships and life challenges (Caplan, 2002; 2003; 2005; Chak & Leung, 2004; Davis, Flett & Besser, 2002; Leung, 2004; Morahan-Martin & Schumacher, 2000; Young, 1998; Young & Rogers, 1998). Studies conducted in Turkey primarily focus on Internet addiction and pathological Internet use (Bölükbaş, 2003; Gönül, 2002; Öztürk, Odabaşıoğlu, Eraslan, Genç & Kalyoncu, 2007). However, more research needs to be done.

The relationship between psychosocial wellbeing and Internet use is an established area of research interest, with studies on obsessive Internet use suggesting the negative influence of uncontrollable Internet use on health variables such as depression and loneliness (Koç, 2011; Moody, 2001; Morahan-Martin, 2007, 2008; Whang, Lee & Chang, 2003). Whang, Lee, and Chang (2003) report that people obsessed with the Internet are oversensitive to disappointment resulting from interpersonal relationships and show increased anxiety when communicating with people they do not know well. When compared with the control group, Internet addicts were found to have higher levels of depression and compulsive tendencies (Özcan, & Buzlu, 2005; Öztürk et al., 2007).

Psychosocial disorders such as loneliness and depression are also associated with problematic Internet use. Studies suggest that such disorders can result in problematic Internet use (Caplan, 2007; LaRose, Lin & Eastin, 2003; Sanders, Field, Diego & Kaplan, 2000). To understand why people suffering from psychological disorders develop a tendency for problematic Internet use or how problematic Internet use leads to psychological problems, some theories on the topic need to be examined. Personal issues arising through problematic Internet use could be mitigated by identifying factors of problematic use that the user finds appealing (Griffiths, 2000). A number of theories have been suggested to explain the reasons for Internet use. Cognitive-behavioural theory (Davis, 2001), the social skill model (Caplan, 2005), and social-cognitive theory (LaRose, Lin, & Eastin, 2003) could be employed.

Davis (2001) uses cognitive-behavioural theory to explain problematic Internet use as a psychiatric condition characterized by incompatible thoughts and pathological behaviour. Cognitive-behavioural theory does not define problematic Internet use simply as a behavioural addiction, but also as a cognitive-behavioural condition with serious negative impacts on one's life. According to Davis, people suffering from obsessive thoughts start to accept the Internet as a 'friend,' and this in turn triggers problematic behaviour (Yellowlees & Marks, 2007). Grohol (1999) explains Internet addiction using the cognitive-behavioural approach. Rather than examining the nature of the addiction, he focuses on the 'compulsive behaviour' and its 'treatment' (Özcan & Buzlu, 2005). Problematic Internet use is defined as a multidimensional condition leading to negative social, academic and professional outcomes and manifesting cognitive-behavioural symptoms (Caplan, 2005). Cognitive-behavioural theory concentrates on 'irrational beliefs' and possible changes in these beliefs. The individual finds excuses to spend more time online. Classic conditioning, an aspect of behavioural theory, argues that even though the Internet does not have much meaning in the beginning, it can become a pleasure the user wants to repeat when s/he starts to have positive experiences with online games and chat. Operant conditioning, on the other hand, argues that reaching information quickly using the Internet and engaging in virtual relationships are reinforcing activities (Beard, 2005; Serin, 2011).

Research shows that personality traits and psychological disorders play an important role in developing Internet addiction, particularly in adults; it also demonstrates that Internet addiction leads to a decrease in psychosocial wellbeing for adults. These findings support the view that there is a two-way relationship between Internet addiction and mental health (Ceyhan, 2008; Morahan-Martin, 2007; Whang, Lee & Chang, 2003). It is possible to find users suffering from Internet addiction in different cultures, where adults are also reported as being most at risk (Ceyhan, 2008; Kim, Namkoong, Taeyun & Kim, 2008; Ko, Yen, Chen, Chen, Wu, & Yen, 2006; Lin, & Tsai, 2002; Yen, Ko, Yen, Chen, Chung, & Chen, 2008). An increasing number of adults show symptoms of Internet addiction or pathological/unhealthy Internet use, and their daily life, academic success and social relationships are influenced negatively (Ceyhan, 2008).

Davis (2001) states that psychosocial disorders such as loneliness and depression are indirect results of problematic Internet use. Caplan (2005) argues that these users prefer online communication because they find it much less risky than face-to-face communication. Involuntary Internet use, on the other hand, causes negative outcomes such as low grades, absenteeism, and reduced social interaction. Social-skills theory (Kim, LaRose & Peng, 2009) argues that individuals observe people around them and tend to exhibit behaviours that they feel are appropriate for the social context. Socio-cultural theory, on the other hand, focuses on the familial, social and cultural dynamics that lead to compulsive Internet use. For instance, for users who use the Internet to escape family-related problems, the Internet can turn into an addiction (Beard, 2005).

Lake (1990) suggests that lonely people often show symptoms of depression and anger while also demonstrating a tendency to misunderstand people. Loneliness can be described as the inner emotional reflection of interpersonal losses, needs and incompetence. The increase in loneliness is mirrored by the increase in depressive symptoms (Pretorious, 1993). Young (1982) argues that to prevent loneliness, irrational beliefs of lonely people need to be addressed. Killen (1998) has investigated loneliness within the sociocultural framework. This view states that the individual who has problems complying with social norms feels lonely in his lack of conformity. Scholars have described young people as deprived of social skills and pessimistic about relationships with other people (Demir & Tezer, 1995; Deniz, Hamarta, & Arı, 2005; Jones, Hobbs, & Hockenbury, 1982; Marcoen, Brumagne, 1985). Brage, Meredith, & Woodward (1993) found that older adults are lonelier than younger adults and that there is a significant correlation between loneliness and depression. In a study investigating loneliness in university students, Demir (1990) found that 15.4% of the research sample suffered from loneliness. There are also scholars who study the correlation between loneliness and Internet use (Caplan, 2002; Eldeleklioğlu, 2008; Kim, LaRose & Peng, 2009; Morahan- Martin & Schumacher, 2000; Özcan, & Buzlu, 2005; 2007; Whang, Lee & Chang, 2003).

Life satisfaction is defined as the extent to which an individual accomplishes set targets (Koç, 2001) and as the positive evaluation of one's life with regard to set targets (Diener, Emmons, Larsen & Griffin, 1985). Life satisfaction refers to the state of wellbeing expressed by different positive emotions such as happiness and morale as well as feeling positive with regard to everyday relationships. Recently, an increase was observed in the number of studies investigating the variables that influence the degree of life satisfaction among university students (Bulut Serin, Serin & Özbaş, 2010; Bulut Serin, Aydınoğlu & Aysan, 2010; Çivitçi, 2007; Deniz, 2006; Gündoğar, Gül, Uskun, Demirci & Keçeci 2007; Çeçen, 2008). However, no study was found on the correlation of life satisfaction and problematic Internet use.

Problems faced by university students, such as adaptation difficulties and underlying psychological problems, cause problematic Internet use (İşbulan, 2011; Koç, 2011; Şahin, Balta & Ercan, 2010; Toprakçı, 2007). Kandell (1998) highlights that in comparison to other age groups, Internet addiction is a bigger problem among university students. Being away from home, using spare time badly, and use of the Internet for educational reasons are listed as some of the reasons for increased risk for addiction for this group. However, these studies have not sufficiently set forth the reasons for problematic Internet use. Studies focusing on the reasons for problematic Internet use in Turkey are scarce, as is the case around the world. This study aims to investigate both the correlation between gender and problematic Internet use and the impact of personality traits, life satisfaction and loneliness variables on the problematic Internet use among university students. Within this general framework, answers to the following questions were sought:

a. does problematic Internet use among university students show significant difference in terms of gender?
b. to what extend do personality traits, life satisfaction and loneliness variables predict the levels of problematic Internet use?

RESEARCH METHODOLOGY

Research Design

This study uses a quantitative descriptive design to explain the correlation between levels of problematic Internet use among university students and personality traits, life satisfaction and loneliness variables.

The Sample

The research sample is comprised of 411 students studying in the Faculty of Education at a private university in the Turkish Republic of Northern Cyprus, selected using quota sampling. 64 percent (n=263) of the participants are female and 36 percent (n=148) are male. Prior to data collection, students were provided with information about the study and only those who volunteered to take part were chosen.

Data Collection Methods

Data was collected using Online Cognition Scale (OCS), Revised-Abbreviated Eysenck Personality Questionnaire Form (EPQR-A), Lie Satisfaction Scale (LSS) and UCLA Loneliness Scale. Each is explained below.

Online Cognition Scale (OCS): Developed by Davis, Flett, & Besser (2002), to assess Problematic Internet Use along with its four sub-dimensions (loneliness/depression, diminished impulse control, distraction, and social comfort), the scale is made up of 36 items on a 7-point Likert scale. The Online Cognition Scale was adapted for use in Turkey by Özcan with a test-retest reliability determined as r=.90 and the standardized alpha .93 (Özcan, 2004). Reliability is high with Cronbach Alpha of .89.

Eysenck Personality Questionnaire Revised-Abbreviated Form (EPQR-A): Upon revising the 48 item Eysenck Personality Questionnaire, Eysenck, Eysenck & Barrett (1985) created the Eysenck Personality Questionnaire Revised-Abbreviated Form. The questionnaire is made up of 24 items and examines identity using three main factors: (a) extraversion, (b) neuroticism, and (c) psychoticism. Additionally, a lie sub scale is administered to prevent possible bias and to check validity. Each of these factors is examined through 6 items and participants are asked to answer each of the 24 questions 'yes' (1) or 'no' (0). For each personality type, participants are scored from 0 to 6.

Life Satisfaction Scale (LSS): The Life Satisfaction Scale was developed by Diener, Emmans, Larsen and Griffin (1985). It is made up of 5 items on a 7-point Likert scale and measures subjective wellbeing. Internal consistency ranges from .80 to .89. Cronback Alpha reliability was .84.

UCLA Loneliness Scale (UCLA-LS): UCLA Loneliness Scale was developed by Russell, Peplau and Cutrona (1980); the validity and reliability of its adapted version is tested by Demir (1989). The scale measures the overall feelings of loneliness in individuals through a self-report Likert-type scale comprised of 20 items. 10 of these items are positive statements and the rest are negative statements. The scale reports range from 20 to 80 where higher scores mean a higher degree of feelings of loneliness. Reliability of the scale is reported as .96. In this study, Cronbach Alpha reliability is found to be .93.

Data Analysis

Multiple regression analysis was used to identify the main predictors of problematic Internet use while t-Test analysis assessed the correlation between gender and problematic Internet use. Data was analysed using SPSS. A significance level of .05 was accepted.

FINDINGS

This study examines problematic Internet use in terms of gender variables. Table 1 reports the mean scores, standard deviation, and t-values of female and male students in relation to the Online Cognition Scale.

Table 1. Mean scores, standard deviation, and t-values of problematic Internet use according to gender

Variables	Gender	n	Mean	SD	t_{409}	p-value
Social support	Female	263	28.866	13.835	3.604	.000*
	Male	148	33.932	13.397		
Loneliness-depression	Female	263	12.304	6.843	3.827	.000*
	Male	148	15.135	7.789		
Reduced impulse control	Female	263	22.836	10.853	3.747	.000*
	Male	148	26.966	10.495		
Distraction	Female	263	17.418	8.659	2.823	.005*
	Male	148	19.932	8.678		
Problematic Internet use	Female	263	81.425	36.390	3.933	.000*
	Male	148	95.966	35.244		

*p<.05

In Table 1, the differentiation of levels of problematic use among students is examined using t-Test analysis. The independent variable is gender. A statistically significant differentiation can be found between the mean for levels of problematic Internet use (t=3.93<.05) and sub-dimensions of social support (t=3.60; p<.05), loneliness-depression (t=3.82; p<.05), reduced impulse control (t=3.74; p<.05), and distraction (t=2.82; p<.05). As Table 1 demonstrates, mean scores of males with regard to problematic Internet use and its sub-dimensions are higher than those of female students.

Correlations of scores for the Online Cognition Scale, Eysenck Personality Questionnaire Revised-Abbreviated Form, and UCLA Loneliness Scale are given in Table 2. It was found that the scattering diagram, which was designed for standardised residual values and predicted values, identifies a linear relationship, and points tend to be collected around an axis. arithmetic mean, standard deviation and correlation values about predictors (neuroticism, extraversion, psychoticism, lying, life satisfaction, loneliness) are given before regression analysis. When the scattering diagrams and correlations based on the partial relationships between predictor variables and problematic Internet use are examined, there is a positive and linear correlation between problematic Internet use and neuroticism, extraversion, psychoticism and lying. When Table 2 is examined, it is apparent that the correlation of dependent variables is not high enough to cause multicollinearity problem. During multi regression analysis a linear relationship was observed between predictors and problematic Internet use, as well as normal distribution.

Table 2. Arithmetic Mean, Standard Deviation and Correlation Martix Values of the variables used to predict problematic Internet use.

Variables	1	2	3	4	5	6	7	Mean	SD
Neuroticism (1)	-							3.260	1.763
Extraversion (2)	-.495**	-						3.669	1.792
Psychoticism (3)	-.092*	.122*	-					1.712	1.086
Lie (4)	-.119*	.119*	-.134*	-				3.785	1.561
Life Satisfaction (5)	-.070	.148*	.003	.341**	-			24.815	6.297
Loneliness (6)	-.003	.160*	-.162*	.192**	.198**	-		57.747	9.785
Problematic Internet use (7)	-.787**	.544**	,117*	.223**	.258**	.032	-	86.661	36.611

**p< .01 *p< .05

Multiple regression analysis relating to predictor variables of neuroticism, extraversion, psychoticism, life satisfaction and lying, and prediction of problematic Internet use. Results of the analysis is provided in Table 3.

Table 3. The variables that predict Problematic Internet use according to multiple linear regression analysis.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
	B	Std. Error	Beta			Zero-order	Partial	Part
(Constant)	89.047	7.853		11.339	.000			
Neuroticism	-13.737	.655	-.674	-20.983	.000	-.787	-.722	-.581

Extraversion	4.256	.779	.179	5.464	.000	.544	.262	.151
Psychoticism	1.242	.965	.037	1.287	.199	.117	.064	.036
Lie	1.709	.661	.078	2.586	.010	.223	.128	.072
Life satisfacton	.836	.152	.165	5.507	.000	.258	.264	.152
Loneliness	-.152	.110	-.041	-1.388	.166	.032	-.069	-.038
R= .831 R^2=.690 $F_{(6, 404)}$=150.211 p=.000								

Predictors: Neuroticism, extraversion, psychoticism, lying, life satisfaction, loneliness
Dependent Variable: Problematic Internet use

Examination of Table 3 reveals a negative correlation at a high level (r= -.79) between neuroticism and problematic Internet use when the binary and partial correlations between predictor variables (neuroticism, extraversion, psychoticism, lying, life satisfaction, loneliness) and the dependent variable (problematic Internet use) are examined. However, when other variables are examined, it appears that the correlation between two variables is r= -.73. The analysis also reveals a positive meaningful correlation at a medium level between extraversion and problematic Internet use. However, when the other five variables are examined, it appears that this correlation is calculated as r=.26. A positive correlation at a low level (r=.22) is perceived between lying and problematic Internet use; however, when this is compared with other variables, the correlation between two variables becomes r= -.13. Similarly, there is a positive correlation at a low level (r=.25) between life satisfaction and problematic Internet use. When this is compared with other variables, the correlation between two variables becomes r= -.26. Along with extraversion, psychoticism, lying, life satisfaction, and loneliness, neuroticism has a strong meaningful correlation with problematic Internet use among university students (R= .831, R^2 =.690, p<.01). The six variables examined here explain 69 percent of total variance in problematic Internet use. According the standardised regression coefficient (B), predictor variables can be ordered relative to their importance in problematic Internet use as neuroticism, extraversion, psychoticism, lying, life satisfaction, and loneliness. When t-Test results about the significance of regression coefficient are examined, neuroticism, extraversion, lying and life satisfaction variables appear to be significant predictors for problematic Internet use. On the other hand, psychoticism and loneliness are not significant predictors of problematic Internet use. According to regression analysis, the regression equation of problematic Internet use prediction is as follows: Problematic Internet Use = 89.047 – 13.737 Neuroticism +4.256 Extraversion, +1.242 Psychoticism, +1.709 Lie, + .839 Life Satisfaction, - .152 Loneliness.

From scatter diagrams that are based on the partial relationships of predictor variables (neuroticism, extraversion, psychoticism, lying, life satisfaction, and loneliness) with problematic Internet use, it is seen that there is a linear positive correlation between problematic Internet use and extraversion, psychoticism, lying and life satisfaction. It was also found that there is a linear and negative correlation between problematic Internet use, neuroticism and loneliness.

DISCUSSION

This section discusses the findings derived from the statistical analysis with reference to the relevant literature.

In this study problematic Internet use and its sub-dimensions of social support, loneliness, depression, decreased impulse control and levels of distraction showed significant variations in terms of gender among university students. Male students were found to suffer more from problematic Internet use. These findings are consistent with the relevant literature (Balta & Horzum, 2008; Choi, 2001; Li & Chung, 2006; Tahiroğlu, Çelik, Uzel, Özcan, & Avcı, 2008; Weitzman, 2000). Possible interpretations of this data are that in comparison to male students, female students have better communication skills, or that male students prefer the Internet to face-to-face communication. On the other hand, Ceyhan (2007), Kim, Namkoong, Taeyun & Kim (2008), Oğuz, Zayim, Özel & Saka (2008) did not find any significant correlation between gender and problematic Internet use. Other studies have found a correlation between problematic Internet use and impulse control disorder (Beard & Wolf, 2001; Davis, Flett, & Besser, 2002). It was suggested that the majority of Internet users engaged in problematic Internet use suffer from impulse control disorder, have a history of addiction disorder, and express this as a deviant behaviour using salient online activities (Yellowlees & Marks, 2007).

The study has also found that neuroticism, extraversion, psychoticism and lying variables are meaningful predictors of the problematic Internet use variable. Neuroticism was found to be the best predictor followed by extraversion, psychoticism and lying. Examination of the relevant literature shows that these findings are consistent with the previous studies. In their studies of adults, Cao & Su (2007) found that those suffering from

Internet addiction received higher scores on the neuroticism, psychoticism, and lying sub-dimensions of Eysenck Personality Questionnaire Revised-Abbreviated Form. Adults with neurotic personality traits use the Internet for interpersonal communication and entertainment whereas extraverts use it solely for interpersonal communication (Wolfradt & Doll, 2001 cited in Ceyhan, 2008). Another study found positive correlations between game addiction and high narcissistic personality traits, higher degrees of aggression, and low self-control (Kim, Namkoong, Taeyun & Kim, 2008).

Life satisfaction was found to predict problematic Internet use at a low level. Studies focusing on the correlation between problematic Internet use among university students and life satisfaction are highly limited. Studies concentrate on the impact of personality as an internal factor on subjective wellbeing (Diener, Oishi & Lucas, 2003). Deneve & Cooper (1998) found that personality is a strong predictor of life satisfaction and happiness. In a study on Taiwanese adults, Ko, Yen, Yen, Lin & Yang (2007) investigated the extent to which personality traits, self-esteem, life satisfaction, mental health, and family functions predict Internet addiction. Research shows that personality traits and mental health disorders, particularly in adults, play an important role in developing Internet addiction and Internet addiction leads to a decrease in life satisfaction and social wellbeing (Koç, 2011; Moody, 2001; Morahan-Martin, 2007, 2008; Whang, Lee & Chang, 2003).

Loneliness was also found meaningfully to predict problematic Internet use at a low level. There is research showing that those who are suffering from high levels of problematic Internet use also have high levels of loneliness (Ayaroğlu, 2002; Ceyhan, 2007; Caplan, 2002; Eldeleklioğlu, 2008; Kim, LaRose & Peng, 2009; Kurtaran, 2008; Morahan-Martin & Schumacher, 2000; Morahan-Martin & Schumacher, 2003; Sanders, Field, Diego & Kaplan, 2000; Özcan, & Buzlu, 2005; Whang, Lee, & Chang, 2003). In a study on university students, Koç (2011) concluded that Internet use leads to an increase in psychological disorders such as depression and loneliness. Furthermore, Internet addicts who lack social support look for online solutions to their problems, and this leads to further psychological problems and symptoms of anxiety.

CONCLUSIONS AND RECOMMENDATIONS

This section makes informed suggestions about Internet addiction using the findings of this study.

This study concludes that males are more at risk than females in terms of problematic Internet use. Social support programs as well as individual and group work could be suggested for both male and female students that are at risk. Personality traits, life satisfaction and loneliness are significant predictors of problematic Internet use among students. Precautions need to be taken for university students to develop healthy personality traits, to enhance positive feelings and happiness, and to form social support networks.

It was observed that university students are the group most at risk in terms of developing problematic Internet use (Nalwa & Anand, 2003). That the Internet is always available, and is fast and free, are given as reasons for the problem. Researchers who argue that the Internet addiction is formed cognitively believe that cognitive behavioural therapy is a viable treatment (Davis, 2001; Yellowlees, 2001). These treatment strategies suggest a cognitive reconstruction regarding the Internet applications users often use, along with behavioural exercises and therapies. Students who manifest a high degree of problematic Internet use could be treated by cognitive behavioural therapy provided by psychological consultants working in counselling and guidance centres. Additionally, seminars, conferences and activities could be organised to highlight the negative consequences of problematic Internet use.

This study has some limitations. It examines solely problematic Internet use, personality traits, life satisfaction and loneliness and the correlation among these factors. With regard to the methods, the main limitation of the study is its being a descriptive study and as such not being able to identify causal linkages among the factors it investigates. Another limitation of the study is that it was carried out only in one university with no consideration of the socio-economic conditions of the participants. It would be appropriate to conduct quantitative and qualitative studies with a larger and more heterogeneous sample. These are the serious limitations of this study. However, studies focusing on the impacts of the Internet within the context of Northern Cyprus are very new and highly limited. It is believed that the findings of this study can help decrease the negative consequences of problematic Internet use.

REFERENCES

Ayaroğlu, N. S. (2002). The Relationship between internet use and loneliness of university students. Unpublished master's thesis, Middle East Technical University, Ankara.

Balta. O. Ç. & Horzum, M. B. (2008). The Factors that affect Internet addiction of students in a web based learning environment. *Ankara University, Journal of Faculty of Educational Sciences,* 41(1), 187-205.

Beard, K.W. (2005). Internet addiction: A review of current assessment techniques and potential assessment questions. *CyberPsychology & Behavior,* 8 (1), 7- 14.

Beard, K.W. & Wolf, E. M. (2001). Modification in the proposed diagnostic criteria for Internet addiction. *Cyberpsychology & Behavıor*, 4 (3), 377- 383.

Bölükbaş, K. (2003). Internet cafes and sociological research on Internet addiction: the case of Diyarbakır. Unpublished master's thesis, Dicle University School of Social Sciences, Department of Sociology, Diyarbakır.

Brage, D., Meredith, W. & Woodward, J. (1993). Correlates of loneliness among midwestern adolescents. *Adolescence*, 28 (111), 685-693.

Bulut Serin, N., Serin, O. & Özbaş, L. F. (2010). Predicting university students' life satisfaction by their anxiety and depression level. *Procedia-Social and Behavioral Sciences, 9,* 579-582.

Bulut Serin, N., Aydınoğlu, N. & Aysan, F. (2010). Examınıng the predictors of loneliness levels of university students. *Procedia-Social and Behavioral Sciences,* 9, 704-708.

Cao, F. & Su, L. (2007). Internet addiction among Chinese adolescents: prevalence and psychological features. *Child Care Health and Development*, 33, 275–281.

Caplan, S. E. (2002). Problematic Internet use and psychological wellbeing: development of a theory-based cognitive-behavioral measurement instrument. *Computers in Human Behavior*, 18,553–75.

Caplan, S. E. (2003). Preference for online social interaction: A theory of problematic internet use and psychosocial well-being. *Communication Research, 30*(6), 625-648.

Caplan, S. E. (2005). A social skill account of problematic Internet use. *Journal of Communication*, 55, 721–736.

Caplan, S. E. (2007). Relations among loneliness, social anxiety, and problematic Internet use. *CyberPsychology & Behavior*, 10, 234-244.

Ceyhan, E. (2007). University students' problematic ınternet use in terms of reasons for Internet use. 6th WSEAS International Conference on Educatıon and Educatıonal Technology, Italy, November 21-23.

Ceyhan, E. (2008). A risk factor for adolescent mental health: Internet addiction. *Journal of Child and Adolescent Mental Health,* 15(2), 109-116.

Chak, K., & Leung, L. (2004). Shyness and locus of control as predictors of Internet addiction and internet use. *CyberPsychology & Behavior*, 7(5), 559-570.

Choi, Y. J. (2001). Investigating Koreans' Internet use patterns and motivationsi and exploring vulnerability of internet dependency. Doctoral dissertation, The University of Southern Mississippi.

Çeçen, A. R. (2008). Sense of coherence, family sense of coherence and self esteem in predicting life satisfaction among Turkish university students. *Educational Science: Theory & Practice,* 4 (1), 19-30.

Çivitçi, A. (2007). The adaptation of multidimensional students' life satisfaction scale into Turkish: validity and reliability studies. *Eurasian Journal of Educational Research,* 26, 51-60.

Davis, R.A. (2001). A cognitive-behavioral model of pathological Internet use. *Computers in Human Behavior*, 17, 187–95.

Davis, R.A., Flett, G.L. & Besser A. (2002). Validation of a new scale for measuring problematic Internet use: implications for pre-employment screening. *CyberPsychology & Behavior*, 15, 331–47.

Deneve, K. & Cooper, H. (1998). The happy personality a meta analysis of personality traits and subjective well-being. *Psychological Bulletin*, 124, 197-229.

Demir, A. (1989). The validity and reliability of UCLA loneliness scale. *Journal of Psychology,* 7, 14–8.

Demir, A. (1990). Some factors that affect university students' levels of loneliness. Unpublished PhD Thesis, Hacettepe University Institute of Social Sciences, Ankara, Turkey.

Demir, A. & Tezer, E. (1995). The effect of psychological counseling in groups on the depression and loneliness levels of university students. *Psychiatry Psychology Psychopharmacology Journal*, *3* (4), 243-248.

Deniz, M.E. (2006). The relationships among coping with stress, life satisfaction, decision making styles and desicion self esteem: An investigation with Turkish University Students. *Social Behaviour and Personality*, 34(9), 1161-1170.

Deniz, M. E., Hamarta, E. & Arı, R. (2005). An investigation of social skills and loneliness levels of university students with respect to their attachment styles in a sample of Turkish students. *Social Behavior and Personality, 33*, 19-32.

Diener, E., Emmons, R. A., Larsen, R. .J. & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment.* 49(1), 71- 75.

Diener, E., Oishi, E. & Lucas, E. (2003). Personality, culture and subjective wellbeing: emotional and cognitive evaluations of life. *Annual Review Of Psychology***,** 54, 403-425.

Eldeleklioğlu, J. (2008). Gender, romantic relationships, Internet use, perceived social support and social skills as the predictors of loneliness. *Eurasian Journal of Educational Research*, 33, 127-140.

Eysenck, S.B.G., Eysenck, H.J. & Barrett, P.A. (1985). Revised version of the psychoticism scale. *Personality and Individual Differences,* 6, 21–29.

Gönül, A. S. (2002). Pathological Internet use. *Symposium***,** 40(3), 105-110.
Griffiths, M. D. (1996). Internet addiction: an issue for clinical psychology? *Clinical Psychology Forum,* 9, 32-36.
Griffiths, M. D. (1997). Psychology of computer use: XLIII. Some commentsn "addictive use of the internet" by Young (comment). *Psychological Report*, 80, 81-82.
Griffiths, M. D. (2000). Does Internet and computer ''addiction'' exist? Some case study evidence. *Cyberpsychology and Behavior*, 3 (2), 211–218.
Grohol, J. (1999). *Internet addiction guide* available at: http://psychcentral.com/netaddiction/.
Gündoğar, D., Gül, S. S., Uskun, E., Demirci., S. & Keçeci, D. (2007). Examination of predictors of life satisfaction in university students. *Clinical Psikyatri*, 10,14-27.
İşbulan, O. (2001). Opinions of university graduates about social networks according to their personal characteristics. *TOJET: The Turkish Online Journal of Educational Technology,* 10(2), 184-189.
Jones, W. H., Hobbs, S. A, & Hockenbury, D. (1982). Loneliness and social skill deficits. *Journal Personality and Social Psychology, 42,* 682-689.
Kandell, J. (1998). Internet addiction on campus the vulnerability of college students. *Cyberpsychology & Behavior*, 1, 46–59.
Kaltiala-Heino, R., Lintonen, T. & Rimpela, A. (2004). Internet addiction: potentially problematic use of the Internet in a population of 12–18 year-old adolescents. *Addiction Research and Theory*, 12(1), 89–96.
Killeen, C. (1998). Loneliness: an epidemic in modern society. *Journal of Advanced Nursing*, 28(4), 762-770.
Kim, E.J., Namkoong, K., Taeyun Ku. T. & Kim, S. J. (2008). The relationship between online game addiction and aggression, self-control and narcissistic personality traits. *European Psychiatry,* 23, 212-218.
Kim, J, LaRose, R. & Peng, W. (2009). Loneliness as the cause and the effect of problematic Internet use: the relationship between Internet use and psychological well-being. *CyberPsychology & Behavior*, 12(4), 451-455.
Ko, C.H., Yen, J.Y., Chen, C.C., Chen, S.H., Wu, K. & Yen, C.F. (2006). Tridimensional personality of adolescents with Internet addiction and substance use experience. *Canadian Journal Psychiatry*, 51, 887-894.
Ko, C.H., Yen, J.Y., Yen, C.F., Lin, H.C. & Yang, M.J. (2007). Factors predictive for incidence and remission of Internet addiction in young adolescents: A prospective study. *Cyberpsychology Behavior*, 10, 545-551.
Koç, M. (2011). Internet addiction and psychopathology. *TOJET: The Turkish Online Journal of Educational Technology,* 10(1),143-148.
Kurtaran, G. T. (2008). Examinin the variables predicted Internet addiction. Unpublished Master Thesis, Mersin University Social Sciences Institute, Mersin,Turkey,
Lake, T. (1990). *Loneliness*. London: Sheldon Press.
LaRose, R., Lin, C. A. & Eastin M. S. (2003). Unregulated Internet usage: addiction, habit, or deficient self-regulation? *Media Psychology*, 5, 225–53.
Leung, L. (2004)**.** Net-generation attributes and seductive properties of the Internet as predictors of online activities and internet addiction**.** *Cyberpsychology & Behavıor*, 7(3), 333-348.
Li, S. M. & Chung, T. M. (2006). Internet function and Internet addictive behavior. *Computers in Human Behavior,* 22, 1067–1071.
Lin, S. S. & Tsai, C. C. (2002). Sensation seeking and Internet dependence of Taiwanese high school adolescents. *Computers in Human Behavior*, 18, 411–426.
Marcoen, A. & Brumagne, M, (1985), Loneliness among children and young adolescents. *Developmental Psychology, 21,* 1025-1031.
Moody, E. J. (2001). Internet use and its relationship to loneliness. *CyberPsychology & Behavior,* 4, 393–401.
Morahan-Martin, J. (2007*). Internet use and abuse and psychological problems*. In J. Joinson, K. McKenna, T. Postmes, & U. Reips, Oxford Handbook of Internet Psychology (pp.331- 345). Oxford, UK: Oxford University Press.
Morahan-Martin. J. (2008*). Internet abuse: Emerging trends and lingering questions*. In A. Barak(Ed.), Psychological aspects of Cyberspace: Theory, research and applications (pp. 32-69). Cambridge, UK: Cambridge University Press.
Morahan-Martin, J. & Schumacher, P. (2000). Incidence and correlates of pathological Internet use among college students. *Computers in Human Behavior*, 16, 13-29.
Morahan-Martin, J. & Schumacher, P. (2003). Lonelines and social uses of the Internet. Computers in Human Behavior, 19(6), 659-671.
Nalwa, K. & Anand, A. P. (2003). Internet addiction in students: a cause of concern. *Cyberpsychology and Behavior*, 6(6), 653–656.
Oğuz, B., Zayim, N., Özel, D., & Saka, O. (2008). Medical students' cognitive status on the Internet. Academic Computing, Faculty of Education University of Onsekiz Mart, Çanakkale.

Özcan, N. K. (2004). The relation between Internet use and psychosocial conditioning in the university student'. Unpublished Ph.D. Thesis, Institute of Health Sciences University of Istanbul, Turkey.

Özcan, N. (2006). The Internet use and its relation with the psychosocial situations among nursing students. 12th International NPNR Conference, Oxford, UK.

Özcan, N. K. & Buzlu, S. (2005). Problematic use of the Internet is a tool to help determine the scale of cognitive status on the Internet, the reliability and validity of the university students. *Journal of Addiction*, 6(1), 19-26.

Özcan, N. K. & Buzlu, S. (2007). Internet use and its relation with the psychosocial situation for a sample of university students. *Cyberpsychology & Behavıor*, 10 (6),767-772.

Öztürk, Ö., Odabaşıoğlu, G., Eraslan, D., Genç, Y. & Kalyoncu,Ö. A. (2007). Internet addiction: clinical presentation and treatment. *Journal of Addiction,* 8 (1), 36-41.

Pretorious, T.B. (1993). The metric equivalence of the UCLA Loneliness Scale for a sample of South African students. *Educational and Psychological Measurement*. 53, 233-239.

Russell, D., Peplau, L.A. & Cutrona, C.E. (1980). The revised UCLA Loneliness Scale: Concurrent and discriminant validity evidence. *Journal of Personality and Social Psychology*, 39(3), 472- 480.

Sanders, C. E., Field, T. M., Diego, M. & Kaplan, M. (2000). The relationship of Internet to depression and social ısolation among adolescents. *Adolescence*, 35(138), 237-242.

Serin, O. (2011). The effects of the computer-based instruction on the achievement and problem solving skills of the science and technology students. *TOJET: The Turkish Online Journal of Educational Technology,* 10(1), 183-201.

Şahin, Y. G., Balta., S. & Ercan, T. (2010). The use of Internet resources by university students during their course projects elicitation: a case study. *TOJET: The Turkish Online Journal of Educational Technology*, 9(2), 234-244.

Tahiroğlu, A.Y., Çelik, G.G., Uzel, M., Özcan, N. & Avcı, A. (2008). Internet use among Turkish adolescents. *Cyberpsychology & Behavıor*, 11(5), 241-246.

Toprakçı, E. (2007). The profıles of the use of the ınternet for study purposes among unıversıty students. *TOJET: The Turkish Online Journal of Educational Technology*, 6(3), 129-144.

Weitzman, G.D. (2000). Family and individual functioning and computer/Internet addiction, Unpublished Doctoral Dissertation, Albany State University, USA.

Whang, S., Lee, S. & Chang, G. (2003). Internet over-users' psychologicalprofiles: a behavior sampling analysis on Internet addiction. *CyberPsychology & Behavior,* 6, 143-150.

Widyanto, L. & Griffiths, M. (2007). Internet addiction: does it really exist? (revisited). In J.Gackenbach (Ed.), *Psychology and the Internet: Intrapersonal interpersonal, and transpersonal implications (2nd ed.).* (pp. 141-163). San Diego, CA, US: Academic Press.

Yellowlees, P. M. (2001). *Your guide to e-health, third millenium medicine on the Internet. Brisbane*: University of Queensland Press.

Yellowlees, P. & Marks, S. (2007). Problematic Internet use or Internet addiction? *Computers in Human Behaviour,* 23, 1447–1453.

Yen, J.Y., Ko, C. H., Yen, C. F., Chen, S. H., Chung, W. L. & Chen, C. C. (2008). Psychiatric symptoms in adolescents with Internet addiction: Comparison with substance use. *Psychiatry Clinical Neurosciology*, 62(1), 9-16.

Young, J. E. (1982). Loneliness, depression and cognitive therapy: theory and application, in L. A. Peplau, D. Perlman (Eds.), *Loneliness: Asourcebook of current theory, research and therapy,* 379-406, New York: Wiley.

Young, K. S. (1998). Internet addiction: the emergence of a new clinical disorder. *Cyberpsychology and Behavior,* 1(3), 237-244.

Young, K. S. & Rogers, R. C. (1998). The relationship between depression and Internet addiction. *CyberPsychology and Behavior*, 1, 25-28.

AN INTERNATIONAL DIMENSION OF THE STUDENT'S ATTITUDES TOWARDS THE USE OF ENGLISH IN WEB 2.0 TECHNOLOGY

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ABSTRACT
Web 2.0 changed the way people used Web in the field of education and especially in foreign language learning. Since its emergence in 2004, it has gained great attention of teenagers and university students. Educators regard Web 2.0. as a language learning/teaching tool. According to International Federation of Accounts (IFAC) report 2000 and beyond (1996) it has been informed that a key goal of accounting programs should be to teach students to learn on their own. The purpose of this research was to determine undergraduate and high school students' attitudes towards the use of English in Web. 2.0. technologies. This study was mainly based on quantitative design that involved 534 students out of randomly selected 550 participants from 6 different universities and 3 high schools in Turkey and Iraq. The potential of Web 2.0. was determined as creating formal and informal learning environments. Within the context of the study, the students' attitudes were revealed and recommendations were developed for language teachers and educators. It has been found that Web 2.0 technologies serve as a good learning tool in which the learners find the opportunity to practice language in a real-like atmosphere: **the new medium**.
Keywords: Web 2.0 technologies, foreign language learning, English language teaching.

INTRODUCTION
English, "by far the most widely used of all living languages", is taught as foreign language at schools of most nations (Broughton, Brumfit & Brumfit, Flavell, Hill, Pincas, 2003), but it has been recently accepted that language students have started using communication tools via English. This attempt starting with CALL continues to be popular with Web 2.0 nowadays. The increasing popularity of Web 2.0 technologies in almost every field of daily and academic life has promoted researchers to consider whether and to what extent such educational tools can be benefitted from. The study conducted by İşman (2008) proves that the improvements in communication tools have had a direct influence upon education. Web 2.0 can be defined as Web based applications and services that provide users visual, textual, audial communication, interactive information, shared content, collaboration, authenticity and digital literacy (Haythorthwaite & Kazme 2004; O' Reilly, 2005; Giustini, 2006; Maness, 2006; Miller, 2006; Price, 2006; Richardson, 2006; Mcloughlin & Lee, 2007; Lankshear & Knobel 2007; Boyd & Ellison, 2008; Thomas, 2009; Motteram & Sharma, 2009). The types of Web 2.0 used in education include "blogs (Facebook, Twitter etc.), wikis, multimedia sharing services, content syndication, podcasting and content tagging services" (Anderson, 2007). Particularly in foreign language learning, many researchers have shown that Web 2.0 can be utilized as an effective educational tool since it enables a variety of collaboration, communication and interaction (Fullan, 1993; Pica, 1997; Jonassen, Peck and Wilson, 1999; Lee, 2005; Munoz, 2009, Warschauer, Shetzer, & Meloni, 2000; Sykes, Oskoz & Thorne, 2008; Kayri & Çakır, 2010). In addition to being collaborative, interactive and communicative tool in education, Web 2.0 also has an undeniable effect on the enhancement of writing skills for learners (Mason & Rennie, 2008, Vijayakumar, 2011). The more there is an emphasis on learner autonomy, the more Web 2.0 tools have gained significance by enabling facilities for independency (Crook, 2008, Cooker, 2010). Moreover, the study conducted by Lam (2000) revealed that Web 2.0 tools increased the motivation of learners. However, these tools may be disruptive if they aren't implemented carefully into classroom practice (Godwin-Jones, 2005, Mason & Rennie, 2008). On the contrary, they might be more disadvantageous because of exploitation, lack of confidence, privacy and control (Merchant, 2001; Livingstone, 2002; Patchin and Hinduja, 2010). The importance of Web 2.0 tools in education have been emphasized a lot in most studies. Even if there are few studies (Chun and Plass, 1996 ; Warscahauer and Kern, 2000) exploring the practices of Web 2.0 tools in foreign language education, there is almost no study focusing on students' perceptions upon the use of Web 2.0 tools in foreign language learning, though. Hence, this study tries to reveal the most recent perceptions and implications by investigating the roles of Web 2.0 tools in foreign language education. Furthermore, it gives some clues about how to make the efficient use of Web 2.0 tools by providing some practical implications for teacher education and training. In order to achieve these aims, the following are the research questions of the study:

1. What are the perceptions of foreign language learners in using Web 2.0 technologies?
2. Do students regard Web 2.0 as an opportunity for English language learning?
3. Do socio-cultural differences affect the students' views about the use of Web 2.0 in foreign language learning?
4. Can the use of Web 2.0 contribute significantly to English language learning?

METHOD

In this study, a descriptive analysis was carried out. After the analysis of the questionnaires, semi-structured and focus group interviews were made. Ten students were chosen randomly from the institutions located in Turkey. The questionnaire allowed gathering information about students' perceptions of themselves in using English regarding the following items: using blocks, use of a different language except English, writing status messages, sharing videos, sharing writings, joining groups, creating groups, joining groups to learn English, playing games, learning vocabulary through games, using applications, linking to fun pages, commenting on photos, commenting on videos, commenting on status messages, making foreign friends, chatting on line, feeling confidence in courses, enhancing vocabulary knowledge, enhancing speaking skill, enhancing listening skill, enhancing reading skill, enhancing writing skill, using to learn vocabulary, wasting time on internet. The cronbach's alpha reliability factor of the pilot study was found to be .82 in the first application. Additionally, it was calculated as .89 in the second pilot study, that is quite reliable and valid for Likert-type attitude scales (Nunan, 1997). The items in the questionnaire were analysed using the Statistical Package for Social Sciences (SPSS). For every item, frequencies and percentages were calculated. Chi-square tests were applied in order to find the significance of the distribution of the answers.

SETTING AND PARTICIPANTS

The study was conducted at Adıyaman University(N=50, M=17, F=33, A=19-27), Gaziantep University (N=47, M=33, F=14, A=18-24), İnönü University (N=50, M=29, F=23, A=18-25), Erbil Ishik University at which students' mother tongues are Kurdish and Arabic (N=50, M=27, F=23, A=18-20), Gazikent University(N=50, M=32, F=18, A=18-24), Zirve University(N=30, M=17 ,F=13 ,A=18-21), Besni Vocational High School(N=50, M=18, F=32, A=17-35), Sabahattin Zaim Social Sciences High School(N=40, M=17, F=23, A=17), Ishik Hawler Secondary School in which students' native languages are Kurdish and Arabic (N=50, M=50, A=13-16) and Barak Primary School(N=54, M=26, F=28, A=13-14). The participants were placed at appropriate levels from beginner to pre-intermediate level at the beginning of the academic year. The age of the participants vary from 13 to 35 years old.228 of the participants were female and 293 were male at total. For the identification of interview participants, criterion sampling was used (Patton, 1990).

FINDINGS AND RESULTS

In Table 1. to analyze the data frequencies, percentages, means, standard deviations and chi-square results were employed. It was observed that the mean score of Gazikent University was the highest when compared with Adıyaman University and Gaziantep University. The socio-economical level of private university students' is higher than the government institutions. These findings were parallel to the data in Barak Primary School and Sabahattin Zaim Primary School when compared with private institutions at the same level. Chi-square results show that learning is increased by use of technology. In Barak Primary School all of the findings were significant at $p<0.1$ and 0.5 level. When findings were analyzed at Gaziantep University, except the items 16,21,23 and 25, all of the findings were significant at $p<0.1$ level. On the other hand, the findings related to the items 5,12,24 and 25 were significant at $p<0.5$ level in Gazikent University. Item 25 was significant at $p<0.5$ level in İnönü University. This finding was similar to Sabahattin Primary School in item 1 at $p<0.5$ level. The chi-square test results in Adıyaman University were significant at $p<0.1$ and $p<0.5$ level. For questions 11, 12, 14,16,17,18,19,20,21, 22and 23 were all found to be significant at $p<0.5$ level. All of the findings were similar except the college in Iraq which indicates the importance of culture. Items 1, 3,6,7,10,12,13,14,16 and 24were significant at $p<0.5$ level in this college. This preference is related with their family background and strict rules in schools. In Ishik University items 1,20,22,24 and 25 were significant at $p<0.5$ level. These findings suggest that one of the main roles of the EFL teacher is to motivate the learners to use English in different contexts.

Table1. Items Related to the Use of Web 2.0 Tools

Adıyaman (100)

Item	Never f	Never %	Seldom f	Seldom %	Sometimes f	Sometimes %	Usually f	Usually %	Always f	Always %	Mean	Std	x^2	
1	11	11	5	5	19	19	23	23	42	42	3,80	1,33	40,00	**
2	12	12	5	5	20	20	24	24	39	39	3,73	1,35	33,30	**
3	68	68	13	13	18	18	1	1	0	0	1,52	0,82	155,90	**
4	48	48	22	22	27	27	3	3	0	0	1,85	0,93	76,30	**
5	59	59	20	20	13	13	6	6	2	2	1,72	1,04	104,50	**
6	73	73	11	11	11	11	2	2	3	3	1,51	0,98	179,20	**
7	91	91	3	3	3	3	3	3	0	0	1,18	0,63	315,40	**
8	66	66	13	13	11	11	6	6	4	4	1,69	1,13	134,90	**
9	44	44	11	11	22	22	15	15	8	8	2,32	1,38	41,50	**
10	37	37	17	17	27	27	15	15	4	4	2,32	1,23	31,40	**
11	54	54	14	14	25	25	6	6	1	1	1,86	1,05	88,70	**
12	47	47	19	19	23	23	8	8	3	3	2,01	1,14	58,60	**
13	66	66	18	18	15	15	0	0	1	1	1,52	0,82	145,30	**
14	71	71	17	17	9	9	2	2	1	1	1,45	0,82	170,80	**
15	75	75	11	11	11	11	2	2	1	1	1,43	0,84	193,60	**
16	50	50	21	21	15	15	9	9	4	4	1,95	1,18	65,80	**
17	51	51	17	17	14	14	12	12	6	6	2,05	1,30	63,30	**
18	62	62	16	16	14	14	6	6	2	2	1,70	1,05	116,80	**
19	33	33	25	25	24	24	14	14	3	3	2,28	1,16	27,01	**
20	37	37	19	19	28	28	10	10	6	6	2,29	1,23	32,50	**
21	34	34	30	30	18	18	14	14	4	4	2,24	1,18	29,60	**
22	39	39	24	24	17	17	14	14	6	6	2,24	1,27	30,90	**
23	44	44	26	26	15	15	9	9	6	6	2,07	1,22	47,70	**
24	53	53	26	26	15	15	5	5	1	1	1,75	0,96	86,80	**
25	20	20	8	8	38	38	13	13	21	21	3,07	1,37	25,90	**

Gaziantep University (50)

Item	Never f	Never %	Seldom f	Seldom %	Sometimes f	Sometimes %	Usually f	Usually %	Always f	Always %	Mean	Std	x^2	
1	6	12	2	4	4	8	22	44	13	26	3,72	1,28	28,43	**
2	12	24	2	4	2	4	15	30	16	32	3,45	1,61	20,34	**
3	18	36	12	24	14	28	2	4	1	2	2,06	1,03	24,17	**
4	12	24	10	20	18	36	7	14	0	0	2,43	1,04	18,64	**
5	14	28	13	26	13	26	6	12	1	2	2,30	1,10	13,74	**
6	22	44	9	18	6	12	8	16	2	4	2,13	1,30	24,17	**
7	43	86	3	6	0	0	1	2	0	0	1,13	0,49	150,77	**
8	22	44	11	22	6	12	5	10	3	6	2,06	1,28	24,81	**
9	18	36	13	26	9	18	6	12	1	2	2,13	1,13	18,00	**
10	21	42	12	24	10	20	4	8	0	0	1,94	1,01	27,57	**
11	22	44	10	20	9	18	3	6	3	6	2,04	1,23	25,66	**
12	13	26	12	24	14	28	7	14	1	2	2,38	1,11	12,47	
13	19	38	14	28	12	24	2	4	0	0	1,94	0,92	28,00	**
14	20	40	13	26	12	24	1	2	1	2	1,94	0,99	29,06	**
15	19	38	16	32	10	20	1	2	1	2	1,91	0,95	29,49	**
16	16	32	11	22	7	14	9	18	3	6	2,39	1,32	10,09	
17	18	36	9	18	8	16	9	18	3	6	2,36	1,34	12,47	
18	20	40	12	24	10	20	5	10	0	0	2,00	1,04	24,17	**
19	14	28	10	20	15	30	7	14	0	0	2,33	1,08	15,96	**
20	19	38	12	24	7	14	6	12	3	6	2,19	1,28	16,72	**
21	13	26	12	24	12	24	7	14	3	6	2,47	1,23	7,79	*
22	14	28	12	24	12	24	9	18	0	0	2,34	1,11	13,11	
23	15	30	8	16	12	24	9	18	3	6	2,51	1,30	8,64	*
24	24	48	16	32	5	10	2	4	0	0	1,68	0,84	44,60	**
25	12	24	5	10	17	34	7	14	6	12	2,79	1,33	10,77	

Inönü University (100)

Item	Never f	Never %	Seldom f	Seldom %	Sometimes f	Sometimes %	Usually f	Usually %	Always f	Always %	Mean	Std	x^2	
1	14	14	9	9	16	16	33	33	28	28	3,52	1,36	20,30	**
2	18	18	5	5	3	3	22	22	52	52	3,85	1,54	77,30	**
3	64	64	13	13	20	20	3	3	0	0	1,62	0,91	133,70	**
4	38	38	24	24	23	23	12	12	3	3	2,18	1,16	35,10	**
5	48	48	20	20	25	25	6	6	1	1	1,92	1,03	68,30	**
6	66	66	8	8	9	9	14	14	3	3	1,80	1,25	135,30	**
7	93	93	2	2	3	3	0	0	2	2	1,16	0,66	333,30	**
8	67	67	7	7	11	11	9	9	6	6	1,80	1,29	138,80	**
9	58	58	11	11	16	16	11	11	4	4	1,92	1,24	93,90	**
10	46	46	17	17	17	17	17	17	3	3	2,14	1,26	49,60	**
11	51	51	16	16	21	21	10	10	2	2	1,96	1,15	70,10	**
12	41	41	23	23	19	19	12	12	5	5	2,17	1,23	37,00	**
13	59	59	17	17	19	19	5	5	0	0	1,70	0,95	107,80	**
14	68	68	14	14	17	17	1	1	0	0	1,51	0,81	155,50	**
15	63	63	18	18	15	15	4	4	0	0	1,60	0,89	126,70	**
16	50	50	17	17	20	20	3	3	9	9	2,03	1,29	66,61	**
17	55	56	19	20	10	10	10	11	6	6	1,93	1,27	81,10	**
18	61	61	13	13	17	17	5	5	4	4	1,78	1,14	111,00	**
19	38	38	20	20	18	18	16	16	8	8	2,36	1,34	24,40	**
20	43	43	24	24	15	15	10	10	8	8	2,16	1,30	40,70	**
21	44	44	24	24	16	16	13	13	3	3	2,07	1,18	47,30	**
22	40	40	26	26	16	16	13	13	5	5	2,17	1,23	36,30	**
23	40	40	24	24	20	20	12	12	4	4	2,16	1,20	36,80	**
24	60	60	13	13	23	23	3	3	1	1	1,72	0,99	115,40	**
25	17	17	28	28	22	22	16	16	17	17	2,88	1,34	5,10	*

Gazikent University (50)

Item	Never f	Never %	Seldom f	Seldom %	Sometimes f	Sometimes %	Usually f	Usually %	Always f	Always %	Mean	Std	x^2	
1	2	4	8	16	17	34	19	38	4	8	3,30	0,97	23,40	**
2	1	2	11	22	15	30	17	34	6	12	3,32	1,02	17,20	**
3	1	2	8	16	15	30	18	36	8	16	3,48	1,01	17,80	**
4	0	0	7	14	16	32	18	36	9	18	3,58	0,95	21,00	**
5	5	10	6	12	14	28	15	30	10	20	3,38	1,23	8,20	*
6	1	2	5	10	11	22	14	28	19	38	3,90	1,09	20,40	**
7	3	6	4	8	13	26	25	50	5	10	3,50	0,99	34,40	**
8	2	4	11	22	14	28	15	30	8	16	3,32	1,11	11,00	
9	6	12	8	16	15	30	12	24	9	18	3,20	1,26	5,00	*
10	0	0	5	10	16	32	21	42	8	16	3,64	0,88	28,60	**
11	3	6	3	6	8	16	17	34	19	38	3,92	1,16	23,20	**
12	2	4	10	20	11	22	13	26	14	28	3,54	1,22	9,00	*
13	5	10	7	14	14	28	20	40	4	8	3,22	1,11	18,60	**
14	2	4	11	22	10	20	17	34	10	20	3,44	1,16	11,40	
15	1	2	5	10	14	28	22	44	8	16	3,62	0,95	27,00	**
16	5	10	17	34	17	34	9	18	2	4	2,72	1,01	18,80	**
17	0	0	4	8	10	20	19	38	17	34	3,98	0,94	26,60	**
18	2	4	10	20	27	54	8	16	3	6	3,00	0,88	40,60	**
19	3	6	10	20	17	34	15	30	5	10	3,18	1,06	14,80	**
20	2	4	7	14	17	34	14	28	10	20	3,46	1,09	13,80	**
21	5	10	6	12	15	30	10	20	14	28	3,44	1,30	8,20	*
22	1	2	13	26	15	30	14	28	7	14	3,26	1,07	14,00	**
23	1	2	9	18	17	34	16	32	7	14	3,38	1,01	17,60	**
24	6	12	6	12	18	36	11	22	9	18	3,22	1,23	9,80	
25	2	4	5	10	22	44	16	32	5	10	3,34	0,94	29,40	**

Zirve University (30)

Item	Never f	Never %	Seldom f	Seldom %	Sometimes f	Sometimes %	Usually f	Usually %	Always f	Always %	Mean	Std	x^2	
1	1	3	2	7	8	27	13	43	6	20	3,70	0,99	15,67	**
2	4	13	1	3	3	10	12	40	10	33	3,77	1,33	15,00	**
3	7	23	8	27	14	47	1	3	0	0	2,30	0,88	21,67	**
4	3	10	9	30	14	47	4	13	0	0	2,63	0,85	20,33	**
5	7	23	12	40	9	30	2	7	0	0	2,20	0,89	16,33	**
6	13	43	5	17	9	30	1	3	2	7	2,13	1,22	16,67	**
7	27	90	1	3	2	7	0	0	0	0	1,17	0,53	92,33	**
8	15	50	4	13	3	10	6	20	2	7	2,20	1,42	18,33	**
9	13	43	6	20	3	10	5	17	3	10	2,30	1,44	11,33	
10	15	50	5	17	6	20	3	10	1	3	2,00	1,20	19,33	**
11	9	30	9	30	8	27	3	10	1	3	2,27	1,11	9,33	*
12	7	23	9	30	7	23	6	20	1	3	2,50	1,17	6,00	*
13	6	20	5	17	12	40	7	23	0	0	2,67	1,06	12,33	
14	7	23	7	23	11	37	5	17	0	0	2,47	1,04	10,67	
15	7	23	8	27	11	37	4	13	0	0	2,40	1,00	11,67	
16	7	23	5	17	8	27	4	13	6	20	2,90	1,45	1,67	*
17	6	20	10	33	5	17	7	23	2	7	2,63	1,25	5,67	*
18	7	23	11	37	5	17	6	20	1	3	2,43	1,17	8,67	*
19	6	20	9	30	6	20	8	27	1	3	2,63	1,19	6,33	*
20	6	20	12	40	7	23	3	10	2	7	2,43	1,14	10,33	
21	7	23	10	33	9	30	2	7	2	7	2,40	1,13	9,67	
22	6	20	8	27	9	30	5	17	2	7	2,63	1,19	5,00	*
23	4	13	11	37	9	30	4	13	2	7	2,63	1,10	9,67	
24	19	63	9	30	2	7	0	0	0	0	1,43	0,63	44,33	**
25	0	0	4	13	6	20	15	50	5	17	3,70	0,92	20,33	**

Ishik University/Iraq (50)

Item	Never f	Never %	Seldom f	Seldom %	Sometimes f	Sometimes %	Usually f	Usually %	Always f	Always %	Mean	Std	x^2	
1	10	20	9	18	17	34	7	14	7	14	2,84	1,30	6,80	
2	23	46	8	16	7	14	6	12	6	12	2,28	1,46	21,40	**
3	20	40	6	12	13	26	6	12	5	10	2,40	1,39	16,60	**
4	21	42	12	24	8	16	6	12	3	6	2,16	1,27	19,40	**
5	27	54	7	14	8	16	5	10	3	6	2,00	1,29	37,60	**
6	31	62	5	10	5	10	4	8	5	10	1,94	1,41	55,20	**
7	28	56	8	16	4	8	6	12	4	8	2,00	1,37	41,60	**
8	29	58	9	18	9	18	2	4	1	2	1,74	1,03	50,80	**
9	35	70	6	12	6	12	1	2	2	4	1,58	1,05	80,20	**
10	29	58	5	10	7	14	4	8	5	10	2,02	1,41	45,60	**
11	22	44	9	18	7	14	5	10	7	14	2,32	1,48	18,80	**
12	21	42	10	20	7	14	6	12	6	12	2,32	1,43	16,20	**
13	24	48	6	12	10	20	4	8	6	12	2,24	1,44	26,40	**
14	24	48	11	22	6	12	4	8	5	10	2,10	1,36	27,40	**
15	22	44	4	8	11	22	2	4	11	22	2,52	1,61	24,60	**
16	20	40	11	22	10	20	6	12	3	6	2,22	1,27	16,60	**
17	19	38	7	14	11	22	11	22	2	4	2,40	1,31	15,60	**
18	24	48	9	18	9	18	6	12	2	4	2,06	1,24	27,80	**
19	21	42	10	20	12	24	6	12	1	2	2,12	1,15	22,20	**
20	15	30	10	20	12	24	9	18	4	8	2,54	1,31	6,60	*
21	14	28	9	18	16	32	9	18	2	4	2,52	1,20	11,80	
22	17	34	7	14	12	24	9	18	5	10	2,56	1,39	8,80	*
23	13	26	6	12	18	36	10	20	3	6	2,68	1,24	13,80	**
24	18	36	11	22	8	16	8	16	5	10	2,42	1,39	9,80	
25	17	34	5	10	14	28	7	14	7	14	2,64	1,44	10,80	

Barak Primary School (54)

Item	Never f	Never %	Seldom f	Seldom %	Sometimes f	Sometimes %	Usually f	Usually %	Always f	Always %	Mean	Std	x^2	
1	18	33	4	7	10	19	6	11	16	30	2,96	1,66	13,78	**
2	15	28	20	37	4	7	8	15	5	9	2,38	1,32	18,19	**
3	45	83	2	4	7	13	0	0	0	0	1,30	0,69	138,41	**
4	36	67	7	13	5	9	3	6	2	4	1,64	1,11	77,47	**
5	40	74	5	9	6	11	0	0	3	6	1,54	1,08	100,63	**
6	46	85	2	4	4	7	1	2	1	2	1,31	0,84	143,96	**
7	49	91	0	0	2	4	2	4	1	2	1,26	0,85	169,15	**
8	51	94	1	2	2	4	0	0	0	0	1,09	0,40	187,30	**
9	27	50	7	13	9	17	3	6	8	15	2,22	1,49	32,30	**
10	34	63	7	13	7	13	4	7	2	4	1,76	1,16	63,96	**
11	41	76	5	9	4	7	1	2	3	6	1,52	1,09	106,37	**
12	41	76	3	6	5	9	2	4	1	2	1,44	0,96	113,38	**
13	44	81	4	7	3	6	2	4	1	2	1,37	0,90	128,04	**
14	44	81	6	11	2	4	1	2	1	2	1,31	0,80	129,15	**
15	46	85	3	6	5	9	0	0	0	0	1,24	0,61	145,07	**
16	33	61	7	13	8	15	5	9	1	2	1,78	1,13	59,70	**
17	33	61	11	20	6	11	1	2	3	6	1,70	1,11	62,30	**
18	42	78	7	13	3	6	0	0	2	4	1,39	0,90	115,07	**
19	44	81	3	6	5	9	2	4	0	0	1,35	0,80	128,78	**
20	38	70	8	15	2	4	4	7	2	4	1,59	1,11	87,85	**
21	34	63	9	17	7	13	2	4	2	4	1,69	1,08	65,81	**
22	34	63	9	17	7	13	2	4	2	4	1,69	1,08	65,81	**
23	41	76	6	11	3	6	4	7	0	0	1,44	0,90	107,30	**
24	38	70	5	9	7	13	2	4	2	4	1,61	1,09	87,30	**
25	29	54	8	15	7	13	3	6	7	13	2,09	1,44	39,70	**

Sabahattin Zaim Primary School (40)

Item	Never f	Never %	Seldom f	Seldom %	Sometimes f	Sometimes %	Usually f	Usually %	Always f	Always %	Mean	Std	x^2	
1	4	10	5	13	8	20	11	28	12	30	3,55	1,32	6,25	
2	4	10	0	0	1	3	7	18	28	70	4,38	1,23	66,25	**
3	27	68	10	25	3	8	0	0	0	0	1,40	0,63	64,75	**
4	24	60	9	23	6	15	0	0	1	3	1,63	0,93	46,75	**
5	28	70	10	25	2	5	0	0	0	0	1,35	0,58	71,00	**
6	22	55	7	18	6	15	5	13	0	0	1,85	1,10	34,25	**
7	39	98	1	3	0	0	0	0	0	0	1,03	0,16	150,25	**
8	33	83	5	13	2	5	0	0	0	0	1,23	0,53	99,75	**
9	15	38	6	15	10	25	2	5	7	18	2,50	1,48	11,75	
10	19	48	10	25	1	3	5	13	5	13	2,18	1,47	24,00	**
11	25	63	8	20	4	10	2	5	1	3	1,65	1,03	48,75	**
12	25	63	5	13	4	10	3	8	3	8	1,85	1,31	45,50	**
13	22	55	6	15	2	5	5	13	5	13	2,13	1,51	31,75	**
14	23	58	3	8	1	3	10	25	3	8	2,18	1,52	41,00	**
15	22	55	7	18	1	3	7	18	3	8	2,05	1,41	34,00	**
16	21	53	6	15	2	5	7	18	4	10	2,18	1,48	28,25	**
17	19	48	10	25	1	3	5	13	5	13	2,18	1,47	24,00	**
18	20	50	5	13	10	25	0	0	5	13	2,13	1,38	28,75	**
19	19	48	1	3	10	25	5	13	5	13	2,40	1,50	24,00	**
20	20	50	10	25	5	13	4	10	1	3	1,90	1,13	27,75	**
21	22	55	8	20	5	13	5	13	0	0	1,83	1,08	34,75	**
22	23	58	7	18	4	10	6	15	0	0	1,83	1,13	38,75	**
23	25	63	5	13	5	13	5	13	0	0	1,75	1,10	47,50	**
24	27	68	3	8	4	10	1	3	5	13	1,85	1,42	57,50	**
25	22	55	8	20	3	8	4	10	3	8	1,95	1,32	32,75	**

Ishik College/Iraq (50)

Item	Never f	Never %	Seldom f	Seldom %	Sometimes f	Sometimes %	Usually f	Usually %	Always f	Always %	Mean	Std	x^2	
1	6	12	6	12	16	32	10	20	12	24	3,32	1,30	7,20	*
2	34	68	5	10	8	16	0	0	3	6	1,66	1,14	75,40	**
3	7	14	7	14	12	24	11	22	13	26	3,32	1,38	3,20	*
4	20	40	2	4	10	20	13	26	5	10	2,62	1,48	19,80	**
5	22	44	8	16	10	20	4	8	6	12	2,28	1,41	20,00	**
6	17	34	7	14	9	18	11	22	6	12	2,64	1,45	7,60	*
7	16	32	8	16	11	22	4	8	11	22	2,72	1,54	7,80	*
8	20	40	10	20	6	12	4	8	10	20	2,48	1,57	15,20	**
9	20	40	4	8	8	16	8	16	10	20	2,68	1,61	14,40	**
10	12	24	7	14	7	14	10	20	14	28	3,14	1,57	3,80	*
11	4	8	11	22	22	44	6	12	7	14	3,02	1,12	20,60	**
12	7	14	8	16	16	32	7	14	12	24	3,18	1,35	6,20	*
13	6	12	6	12	11	22	14	28	13	26	3,44	1,33	5,80	*
14	17	34	5	10	11	22	6	12	11	22	2,78	1,57	9,20	*
15	3	6	7	14	9	18	12	24	19	38	3,74	1,27	14,40	**
16	12	24	8	16	11	22	9	18	10	20	2,94	1,46	1,00	*
17	2	4	2	4	8	16	12	24	26	52	4,16	1,09	39,20	**
18	25	50	5	10	6	12	5	10	9	18	2,36	1,60	29,20	**
19	7	14	4	8	16	32	7	14	16	32	3,42	1,39	12,60	
20	8	16	4	8	7	14	13	26	18	36	3,58	1,46	12,20	
21	5	10	3	6	11	22	12	24	19	38	3,74	1,31	16,00	**
22	6	12	4	8	11	22	7	14	22	44	3,70	1,42	20,60	**
23	5	10	4	8	10	20	7	14	24	48	3,82	1,38	26,60	**
24	12	24	5	10	12	24	6	12	15	30	3,14	1,55	7,40	*
25	19	38	3	6	16	32	5	10	7	14	2,56	1,45	20,00	**

Note : x^2= Chi-Square * $p < .05$ ** $p < .01$

The analyses of the first question that is about using Web 2.0 tools shows that in high schools over half of the students "usually" or "always" use Web 2.0 tools on internet. The results are similar when compared with the universities while % 15 of the all university students "never" or "seldom" use Web.2.0 tools. Technology-driven tools help learners to guide their own learning process. The analyses of the second, third, thirteenth, fourteenth and fifteenth items that are related to students' producing language on internet, 47 % of university students "usually" or "always" prefer commenting on photos, videos and status messages and using their native language in writing while only 74 % of high school students "never" or "seldom" prefer doing these. The process of globalization is important in educational, political, cultural, economic and environmental aspects makes learning English a vital need. The fourth, fifth, sixth, seventh, eighth and sixteenth items that are sharing videos, writings, joining and creating groups and joining groups to learn English and making foreign friends on internet can be categorized as active participation of students. 49 % of all the university and high school students "never" or "seldom" use applications on the internet actively while a small portion of them "usually" or "always" prefer it. Learning is increased by use of technology. Through Web 2.0 tools foreign language learners develop motivation and increase the amount of national knowledge. (Clauss-Ehlers 2006) As for the activities on the internet entertaining the students, the results of the ninth, eleventh, twelfth, seventeenth and twenty- fifth items that are related to it show that 39 % of all the students "never" or "seldom" play games, like fan pages, chat online and waste their time on internet while over half of the students "usually" or "always" entertain themselves on internet. Web 2.0 tools are effective on the performance of foreign language learners. (Pegrum, 2009) For the activities students do for improving themselves, the analysis of the tenth, eighteenth, nineteenth, twentieth, twenty-first, twenty-second, twenty- third and twenty-forth items about learning vocabulary through games, feeling confident in courses, enhancing vocabulary knowledge and skills of speaking, listening, reading and writing, and using internet to learn vocabulary, 60 % of all the students "never" or "seldom" use applications to improve themselves while only 25 % of the students benefit from it. The way the language is grammatically and meaningfully constructed can shape the way people think and use the language in certain contexts. (Deutscher, 2010; Halvorsen, 2009)

DISCUSSION

While there are several studies in the literature indicating that Web 2.0 tools have a good impact on education, most all of these studies had limitations such as being held in one specific area, having only teachers' perspectives and not designed specifically for language education. Thus, conducting a study in public and private institutions in Turkey and Iraq would help us to answer some questions about the extent of applicability of Web 2 tools in language education in various socio-cultural environments. During the interviews conducted in Turkey, all the participants reported that they were familiar with the use of Web 2.0 tools. The results of both questionnaire and the interviews revealed that the need of the students will increase towards technology and English.

Results show that there are differences in students' perceptions about using Web 2.0 tools in language learning. No matter how various perceptions students have, the most important thing that may affect their perceptions is the implementation of these tools into classroom. Therefore, deficiencies in practice may hinder the beneficial wash back. There might be a lot of reasons for it. First of all, lack of awareness in both teachers and students reduces the efficacy of Web 2.0 tools. That students regard Web 2.0 tools as beyond game and free time activity could only be possible when teachers and students value Web 2.0 tools in foreign language education. However, when the classroom practices are evaluated, it can be easily said that the role of Web 2.0 tools has been underestimated. A recent and dramatic example of that is Dynet which is a Web-based program developed to teach English. But, English language teachers regard it time consuming and a big burden. As well as awareness, teachers need a good background knowledge about these tools to implement it effectively, which raises the question whether English language teaching departments provide good basis in teachers' education and technology courses fulfill theoretical and practical needs for application. It can be concluded that if teachers were educated in the field, the use of Web 2.0 could contribute significantly to English language learning .Thus, regarding Web2.0 tools as an opportunity for English Language learning will be inevitable for the learners of the 21st century: **the new medium**.

REFERENCES

Anderson P. (2007). *What is Web 2.0? Ideas, technologies and implications for Education*. JISC Technology and Standards Watch. Retrieved from: http://www.jisc.ac.uk/media/documents/techwatch/tsw0701b.pdf

Brandt, R. (2000). *Teaching and teacher development: A new synthesis for a new century*. Education in a new era

Broughton, G, Brumfit, C. Flavell, R. Hill, P., and Pincas, A.(2003). *Teaching English as a foreign language*. USA: Taylor and Faranchise e-library.

Boyd, D.M. and Ellison, N.B. (2008). *Social Network Sites: Definition, History and Scholarship*. Journal of Computer-Mediated Communication,13(1).

Burns, A., Richards, Jack C. (2009). *The Cambridge guide to second language teacher education*. Cambridge University Press. p. 102-112

Chun, D. M. & Plass, J.L (1996). *The Modern Language Journal*, Volume 80, No 2, pp. 183-198

Crook, C. (2008). *Web 2.0 technologies for learning: The current landscape-opportunities, challenges and tensions*. Learning Sciences Research Institute, University of Nottingham, 24-27.
Clauss-Ehlers, C. S., Yang, Y. T., & Chen, W. C. (2006). *Resilience from childhood stressors: The role of cultural resilience, ethnic identity, and gender identity*. Journal of Infant, Child, and Adolescent Psychotherapy, 5 (1).
Cooker, L. (2010). *Some self-access principles*. Studies in Self-Access Learning Journal, *1*(1), 5-9.
Çakır, Ö. & Kayri, M. (2010). *An applied study on educational use of facebook as a web 2.0 tool: the sample of the lesson of computer networks and communication*. 2, 48-50. DOI : 10.5121/ijcsit.2010.2405
Deutscher, G. (August 26, 2010). *Does your language shape how you think?*. The New York Times.
Fullan, M. (1993). *Why teachers must become change agents*. Educational Leadership, 50,6.
Godwin- Jones. R. (2005). *Emerging Technologies. Skype and podcasting: Disruptive technologies for language learning*. Language Learning and Technology. 9(3). 9-12
Guistini, D. (2006). *How web is changing medicine*. BMJ 333 : 1283 doi: 10.1136/bmj.39062.555405.80 (Published 21 December 2006)
İşman, A. (2008). *Uzaktan Eğitim*. Ankara: Pegema Yayıncılık.
Halvorsen, A. (2009). *"Social networking sites and critical language learning", in Thomas, M. (ed.), Handbook of research on Web 2.0 and second language learning*. pp. 237-258, Hershey, PA: Information Science Reference
Haythornthwaite, C. & Kazmer, M.M (Eds.) (2004). *Learning, Culture and Community in online education: Research and Practice*. Peter Lange, New York.
Hinduja,S. & Patchin,J.W. (2010). *Trends in Online Social Networking: Adolescent Use of MySpace over time*. New Media & Society March 1, 2010 12: 197-21, Florida Atlantic University, USA.
International Federation of Accountants (IFAC) (1996) *2000 and beyond a strategic framework for prequalification education for the accountancy profession in the year 2000 and beyond.* New York, IFAC.
International Federation of Accountants (IFAC). (2000). *Discussion Paper on Assistance Projects in Accountancy Education and Development*. New York: IFAC Education Committee. www.ifac.org
Jonassen, D.H., Peck, K.L., Wilson, B.G. (1999). *Learning with Technology*: *A Constructivist Perspective Columbus*, OH : Merill Prentice Hall.
Knobel, M. and Lankshear, C. (eds) (2007). *A New Literacies Sampler*. New York: Peter
Lam, W.S.E. (2000). L2 *Literacy and the design of the self: A case study of a teenager writing on the internet*. Tesol Quarterly, 34(3), 457-482.
Lee, L. (2005). *Using Web-based Instruction to promote active learning: Learners' Perspectives*. CALICO Journal 23 (1), 139-156.
Livingstone, S.(2002*). London School of Economics and Political Science*, UK.
Maness, J. (2006) . *Library 2.0 theory: Web 2.0 and its implications for libraries. Webology*. 3, 2. Retrieved from http://www.webology.ir/2006/v3n2/a25.html
Mason, R. & Rennie, F. (2008). *E-learning and social networking handbook: Resources for higher education*. New York, NY: Taylor & Francis Group.
McLoughlin, C. & Lee, M. J. W. (2007). *Social software and participatory learning: Pedagogical choices with technology affordances in the Web 2.0 era*. Proceedings ascilite, Singapore. Retrieved from: http://www.ascilite.org.au/ conferences/ singapore07/procs/mcloughlin.pdf
Merchant, G. (2001). *Teenagers in cyberspace: an investigation of language use and language change in internet chatrooms*. Journal of Research in Reading, 24: 293–306.
Miller, P. (2005). *Web 2.0: Building New Library*. Ariadne. 45/ Retrieved from http://www.ariadne.ac.uk/issue45/miller/
Munoz, C.L. (2009). *Opening Facebook. How to use Facebook in the college classroom. Society for Information Technology and Teacher Education Conference*, Charleston, South Carolina.
Motteram, G., & Sharma, P. (2009). *Blending Learning in a Web 2.0 World. International Journal of Emerging Technologies & Society*, 7(2), 83-96
Nunan, D. (1997). *Research Methods in Language Learning*. USA: Cambridge University Press
Oskoz, A., Sykes, J. M. & Thorne S. L. (2008). *Web 2.0, synthetic immersive environments, and mobile resources for language education*. CALICO Journal, 25(3), 528-546. Retrieved from: https://calico.org/html/article_715.pdf
O'Reilly, T. (2005) *'What is Web 2.0: design patterns and business models for the next generation of software'* [http://www.oreilly.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web.20.html]
Patton, M. Q. (1990). *Qualitative evaluation and research methods*. California: Sage Publications.
Pegrum, M. (2009). *Communicative Networking and Linguistic Mashups on Web 2.0, in Thomas, M. (ed.) Handbook of Research on Web 2.0 and Second Language Learning*. Hershey, PA: Information Science Reference.

Pica, T. (1997). *Second language teaching and research relationships: A North American view.* Language Teaching Research, 1(1), 48–72.
Price, K. (2006). *Web 2.0 and education: What it means for us all*. Paper presented at the 2006 Australian Computers in Education Conference, Cairns, Australia.
Richardson, W. (2006). *Blogs, Wikis, Podcasts, and other powerful tools for classrooms*. Retrieved from: http://www.hbe.com.au/PUBLIC/HBEItemImages/ pdf/CO2437.pdf
Thomas. M. (Ed).(2009) *Handbook of Research on Web 2.0 and Second Language learning*, (pp. xix-xx) Global.
Vijayakumar, S (2011). *Using technology for brainstorming in a writing class: An Innovative approach.* Journal of technology for E.L.T. Vol 2, No:2 , 20011.
Warschauer, M. and Kern, R. (2000). *Network-based Language Teaching: Concepts and Practice*. Port Chester, NY: Cambridge University Press.

DEVELOPING EVALUATIVE TOOL FOR ONLINE LEARNING AND TEACHING PROCESS

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ABSTRACT
The research study aims to underline the development of a new scale on online learning and teaching process based on factor analysis. Further to this, the research study resulted in acceptable scale which embraces social interaction role, interaction behaviour, barriers, capacity for interaction, group interaction as sub-categories to evaluate online learning and teaching process. The Statistical Package for the Social Sciences **(**SPSS) was employed for the purpose of data entry, manipulation, and analysis. Factor analysis was employed to reveal validity and reliability of items related to online learning and teaching process. Within the process of developing scale, whole items were constructed through dense literature and reviewed by two experts on the filed of online education. As there is little attention on choosing a right tool to evaluate the practices of online education in the literature, this research study puts forward by revealing alternative evaluative tool as a scale in order to examine the social interaction role, interaction behaviour, barriers, capacity for interaction, group interaction in online learning and teaching process within higher education practices.
Keywords: barriers, online learning, online teaching, scale, social interaction

INTRODUCTION

Online interaction provides negotiated, social learning situation that traditional instruction was transferred to online learning environment (Swan, 2002). As online instructions rely on the theoretical stance of socio-constructivism, collaborative mode of learning is taken place in order to create desirable learning outcomes in online context (Gazi A, 2010). In this respect, online interaction plays a great role to maximize learning opportunities in online context as a social context (Brignall, Valey, 2005; Tu, Corry, 2003). Social presence is essential that online interaction can facilitate this presence for creating collaborative, negotiated, reflected learning (Tu, McIsaac, 2002; Wallace, 2003). In online learning environments, negotiating social information and maintaining social interaction is fostered by having conscious on roles within learning, teaching process (Alvarez, Guasch, Espasa, 2009; Patricia, Tryon, Bishop, 2009). The study of Slagter van Tryon, Bishop (2009) gives insights on the theoretical framework for online instruction as the combination of social information processing and group structure theories.

The adoption of a social-constructivist approach to online teaching and learning and the integration of online collaborative learning in online environment in higher education, paying attention to social interaction, roles in learning, teaching and barriers in online learning, teaching has intensified need (Zhu, Valcke, Schellens, Li, 2009). In this respect, the transition to online teaching and learning makes new challenges that roles, barriers become essential to be considered for having real social interaction in online context (Bennett, Lockyer, 2004). As the study of Maor (2001) stated the roles of tutors as pedagogical, social, managerial and technical actions, making a general evaluation for social interaction based on these roles provided insights to realize the online learning, teaching process. Further to this, considering both merits and pitfalls of online learning, teaching process enriches constructing knowledge in online context.

Engaging learners and tutors in online interaction has been the focus of many studies in the recent decade (Alvarez, Guasch, Espasa, 2009; Swan, 2002; Bryun, 2004; Wallece, 2004). This is so important that active participation enhances learning and also engaging learners and tutors in online interaction provides actively contribute to a group learning experience (Mason, 2002). There are many studies in the literature highlighting the emerging importance of tutors in creating active and collaborative learning environments (Coppola et al., 2002; Easton, 2003; Lim and Cheah, 2003; Sims, 2003; Pan and Sullivan, 2005). Salmon (2002) has framed the roles for online tutors that gaining insights on these roles is essential for quality of online education to l barriers and enhancing to construct knowledge. This is, however, a field of research that has yet to produce further insights into the role of tutors in facilitating communication to overcome barriers in constructing knowledge. Further to this, Berge (1995), Maor (2003), Aksal A (2010) provided a theoretical framework on online interaction, roles. Although many studies pay attention to the roles, barriers and social interaction in online learning teaching process, less attention was drawn to reveal evaluative tool for roles, barriers and social interaction in online learning teaching process (Aksal A, 2009). Therefore, this research study aims to examine the development and validation of a scale in online learning and teaching process based on factor analysis of items within the scale.

METHODOLOGY

The research study employs the development of a new scale on online education. The research study stresses the validity and reliability evaluation of 164 items from the scale based on factor analysis. In this respect, developing a questionnaire as a scale depending on social interaction, roles, barriers in online learning and teaching process is aimed in the research study to fill the gap in the literature.

Participants

The scale was conducted to online learners in the 2010-2011 Spring Semester. The research study covered 62 undergraduate students as research participants. Research participants were selected voluntarily from one of the higher education institutions in Turkey. 23(37, 1%) of the participants were female and 39(62, 9%) were male students. Further to this, Table I in below indicates gender and department of participants as demographic information in the research process.

Table I. Gender and Department of the Research Participants

Profile of the participants	Frequency	Percent (%)
Gender		
Female	23	37.1
Male	39	62.0
Total	62	100
Age		
17-20	47	75.8
21-24	13	21.0
25-29	2	3.2
Total	62	100
Department		
BOTE	62	100
Course		
EB	56	90.3
Other	6	9.7
Total	62	100

Instrument

In the research study, questionnaire was used that consists of demographic information, items and consent form. Demographic information provided an insight on determining independent variables which are gender, department. Further to this, consent form provided to make a bridge of confidentiality among researcher and participants. This made voluntarism for research participants and increase the validity, reliability of the research findings. 164-itemed questionnaire was conducted to create a new scale for online learning and teaching process.

Developing a scale consists of the five steps. In the first step, dense literature was done about online learning and teaching process. The next step is that item pool was created in the scale. In addition, draft of the scale was evaluated and reviewed by two experts in order to make content validity. After that the statistical analysis of the items was done and sub-categories were set as the last step of the process (Namlu, Odabasi, 2007).

The literature provided an insight on the great impact of social interaction for desirable learning outcomes within online learning environments. In constructing knowledge, there is an intensified need to focus on negotiation, reflection and collaborative efforts. In this respect, it is vital to consider the role of social interaction and roles of both learners and tutors within online learning, teaching process. Although online learning, teaching process has merits, it has challenges as barriers to minimize the practices of online pedagogy. Therefore, in online pedagogy, considering social interaction, learning, teaching in online and barriers in online context is crucial. Developing a scale as an evaluative tool for online pedagogy is intensified need that literature stays partial. In this respect, this research study aims to reveal evaluation tool for online learning and teaching process with categories as social interaction role, interaction behaviour, barriers, capacity for interaction, group interaction through statistical analysis.

RESULTS AND DISCUSSION

As this new developed scale is significant for developing evaluative tool for online learning and teaching process, the scale had examined over 164 items. The calculation of the mean and the standard deviation of each item were done by pre-analysis for the scale. Total analysis of the items was done. Then, from the 85 items which total correlation was under 0.20 and test-retest correlation was insignificant on the level of .05 were removed from the scale. Therefore, analysis was done again with the remaining 79 items (Chu, 2006).

Normal distribution analyses of the score were made. This underlined that the minimal score is 98 and the maximum possible score is 280. 182 is the expected range for the scale from the lowest to the highest the range. In this respect, analysis of this scale revealed the highest score as 280 and the lowest as 98 and the range as 182. What is significant in here is that new scale embraced the expected range. The mean of the scores for this scale was as 192.38, the median as 194, the standard deviation as 45, 79. The Skewnes value, as it was calculated for distribution as it was -0.23 and Kurtosis value was 0.599. Therefore, the distribution was normal (See Appendix I for Table 2).

With 79 items covered in this scale, principal component analysis was done. Kaiser- Meyer-Olkin (KMO) value was 0.69 in the analysis. In order to reveal the result of partial correlations as low and distribution for factor analysis as enough or not sufficient, KMO tests were applied. As KMO value needs to be over 0.60, it could be accepted as sufficient as it is close to 0.90 (Nunnally, 1978). Therefore, the KMO value is acceptable for this research (See Appendix II for Table 3).

Barletts' test of sphericity (BTS) which tests correlation matrix = unit matrix of the hypothesis was considered for the study as well. Correlation between the variables as it is different from 1 and also the factor analysis as it is appropriate for the variables were revealed from the result of the rejection of the hypothesis. In addition, v^2 value for BTS was determined as 1444.919 ($p < 0.0001$) for this study. Nunally and Bernstein (1994) paid attention that limit for factor loading need to be 0.40 as cutoff value for the new scale (Nunally, Bernstein, 19948). Therefore, 0.40 value is accepted for this study.

8 factors with eigenvalue of over 1, out of 79 items were resulted by total variance. The percentage of variance for factors of which eigenvalue is over 1 was determined as 70.89%. 5 factors were determined since 8 factors embraced a large number of sub dimensions and there is a need to take the limit to the first decreasing difference point. The Explained Total Variance is shown in Table 4 (See Appendix III for Table 4).

As seen in Table 4, the cumulative explanation percentage for the 5 factors is 61.294%. The results showed that total and loadings percentage of variance are: first factor as 10.390 and 31.484%, second factor as 3.391 and 10.277%, third factor as 2.499 and 7.574%, fourth factor as 2.173 and 6.586%, fifth factor as 1.773 and 5.373%. It is better to reach the higher variation for the better result of factor analysis and also stronger for the structure of the scale. In addition, variance in between 40% and 60% is sufficient. Therefore, variance percentage as over 50% is acceptable range for the study.

Churchill (1980) and Parasuraman et al. (1991) supported the idea that refinement of the instrument needs to deal with the computation of Cronbach's alpha coefficient, exploratory factor analysis, and item-to-total correlation. In this respect, Varimax rotation was done and results revealed the percentage of variances by 5 factors as: 16.321% for the first factor, 14.514% for the second factor, 13.746% for the third factor, 8.938% for the fourth factor and 7.774% for the fifth factor. In there, factor loads represented values between 0.50 and 0.86. Table 5 reflects the items which they included in the factors after the varimax rotation. The result and the outcome of the varimax rotation revealed how items were within the appropriate parameters. In this respect, remaining items represented the mean as in between 2.69 and 1.98 and the standard deviations as in between .80 and 1.27. Further to this, item total correlations were as in between 0.43 and 0.79. This shows us how it is accepted level as the correlation is over 0.20. In addition, Total cronbach alfa was 0.91. As a result of all analysis, online learning and teaching process can be summed under five titles according to the results of the factor analysis. Considering the related literature, these titles are social interaction role, interaction behaviour, barriers, capacity for interaction, group interaction (Gazi A., Aksal A., 2011).

References

Aksal A, F. (2009). Action plan on communication practices: Roles of tutors at EMU distance education institute to overcome social barriers in constructing knowledge. *The Turkish Online Journal of Educational Technology (TOJET), 8*(2).

Aksal A, F. (2010). *Teaching online course: Communication practices and roles of online tutors*. Germany: VDM.

Álvarez, I., Guasch, T. & Espasa, A. (2009). University teacher roles and competencies in online learning environments: a theoretical analysis of teaching and learning practices. *European Journal of Teacher Education, 32*(3), 321-336.

Bennett, S., & Lockyer, L. (2004). Becoming an online teacher: Adapting to a changed environment for teaching and learning in higher education. *Educational Media International, 41*(3), 231-244.
Berge, Z. (1995). The role of the online instructor/facilitator. *Educational Technology, 35*(1), 22-30.
Brignall, T. W. & Valey, T. V. V. (2005). The impact of internet communications on social interaction.*Sociological Spectrum. 25*(3), 335-348.
Bruyn, L. L. (2004). Monitoring online communication: Can the development of convergence and social presence indicate an interactive learning environment? *Distance Education, 25*(1), 67-81.
Chu, K. H. L. & Murrmann, S. K. (2006). Development and validation of the hospitality emotional labor scale. *Tourism Management, 27*, 1181-1191.
Churchill Jr., G. A. & Peter, P. (1980). Measurement abstracts: purpose, policy, and procedures. *Journal of Marketing Research, 17*, 537-538.
Coppola, N. W., Hiltz, S. R., & Rotter, N. G. (2002). Becoming a virtual professor: Pedagogical roles and asynchronous learning networks. *Journal of Management Information Systems, 18*(4), 169-189.
Easton, S. (2003). Clarifying the instructors' role in online distance learning. *Communication Media, 52*(2), 87-105.
Gazi A, Z. (2010). *Preparing and designing online course: Constructivist approach, team work culture*. Germany: VDM.
Gazi A, Z., Aksal A, F. (2011). *Handbook of online pedagogy*. Germany:LAP.
Lim, P. C., Cheah, P. T. (2003). The role of tutor in asynchronous discussion boards: A case study of a pre-service teacher course. *Education Media International, 40*(1/2), 33-47.
Maor, D. (2003). The teachers' role in developing interaction and reflection in an online learning community. *Education Media International, 40*(1/2), 127-137.
Mason, R. (2002). 'E-learning: what have we learnt?' in Rust, C. (ed) Improving Student Learning Using Learning Technology, proceedings of the 2001 9th International Improving Student Learning Symposium. Oxford Centre for Staff and Learning Development, Oxford.
Namlu, A. G., Odabasi, H. F. (2007). Unethical computer using behaviour scale: A study of reliability and validity on Turkish university students. *Computer & Education, 48*, 205-215.
Nunnally Jr., J. C. (1978), *Psychometric theory*. New York: McGraw-Hill Book Company.
Nunnally Jr., J. C. & Bernstein, I. H. (1994). *Psychometric theory*. (3rd ed). New York: McGraw-Hill Book Company.
Pan, C. C., Sullivan, M. (2005). Promoting synchronous interaction in an e-learning environment. *THE Journal, 33*(2).
Parasuraman, A., Berry, L. & Zeithaml, V. A. (1991). Refinement and reassessment of the SERVQUAL scale. *Journal of Retailing, 67*, 420-447.
Patricia J., Tryon, S., Bishop, M. J. (2009). Theoretical foundations for enhancing social connectedness in online learning environments. *Distance Education, 30* (3), 291-315.
Salmon, G. (2002). *E-moderating: The key to teaching and learning online*. London: Kogan Page.
Sims, R. (2003). Promises of interactivity: Aligning learner perceptions and expectations with strategies for flexible and online learning. *Distance Education, 24*(1), 87-103.
Swan, K. (2002). Building communities in online courses: the importance of interaction. *Education, Communication and Information, 2* (1), 23-49.
Tu, C., Corry, M. (2003). Building active online interaction via collaborative learning community. *Computers in the Schools*. 20(3), 51-59.
Tu, C., McIsaac, M. (2002). An examination of social presence to increase interaction in online classes. *American Journal of Distance Education. 16*(3), 131-150.
Zhu, C., Valcke, M., Schellens, T. & Li, Y.(2009). Chinese students' perceptions of a collaborative e-learning environment and factors affecting their performance: implementing a Flemish e-learning course in a Chinese educational context. *Asia Pacific Educ. Rev, 10*, 225–235.

APPENDICES

APPENDIX I

Table 2:
Normal distribution analyses

Statistics		
N		
	Valid	62
	Missing	0
Mean		192.3871
Standard error of mean		5.81617
Median		194.5000
Mode		161.00
Standard deviation		45.7965
Variance		2097.323
Skewness		0.023
Standard error of skewness		0.304
Kurtosis		0.653
Standard error of kurtosis		0.599
Range		182.00
Minimum		98.00
Maximum		280.00
Sum		11928.00

a Multiple modes exist. The smallest value is shown.

APPENDIX II

Table 3:
KMO and Bartlett_s test

Kaiser–Meyer–Olkin Measure of sampling Adequacy		0.689
Bartlett's test of Sphericity	Approximate v2	1444,919
	df	528
	Sig.	000

APPENDIX III

Table 4
The results of factor analysis total variance explained

Component	Initial Eigenvalues			Extraction sums of squared loadings			Rotation sums of square loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative%	Total	% of Variance	Cumulative
1	10.390	31.484	31.484	10.390	31.484	31.484	5.386	16.321	16.321
2	3.391	10.277	41.761	3.391	10.277	41.761	4.790	14.514	30.836
3	2.499	7.574	49.335	2.499	7.574	49.335	4.536	13.746	44.528
4	2.173	6.586	55.920	2.173	6.586	55.920	2.949	8.938	53.520
5	1.773	5.373	61.294	1.773	5.373	61.294	2.565	7.774	61.294
6	1.334	4.043	65.336						
7	1.225	3.711	69.074						
8	1.031	3.124	72.172						
9	0.997	3.022	75.193						
10	0.917	1.941	63.004						
11	0.903	2.735	80.708						
12	0.763	2.313	83.021						
13	0.644	1.951	84.972						
14	0.602	1.823	86.796						
15	0.551	1.670	88.466						
16	0.478	1.476	89.942						
17	0.474	1.436	91.378						
18	0.410	1.244	92.622						
19	0.379	1.150	93.772						
20	0.315	0.955	94.726						
21	0.290	0.880	95.607						
22	0.272	0.825	96.431						
23	0.228	0.692	97.123						
24	0.186	0.565	97.688						
25	0.169	0.512	98.200						
26	0.132	0.400	98.601						
27	0.118	0.359	98.960						
28	0.087	0.264	99.224						
29	0.079	0.240	99.464						
30	0.065	0.198	99.661						
31	0.046	0.140	99.80						
32	0.034	0.104	99.906						
33	0.031	0.094	100.000						

Extraction method: principal component analysis

APPENDIX IV

Table 5

Mean standard deviation, item total, factor analysis and factor loading

Items and factors	Mean	SD	Item total	Varimax factor load
Social interaction role: *α=0.89*				
76. Make participants comfortable with the technology and ultimately to make the technology transparent	2.3387	1.07037	0.531	0.761
80. Encourage the on-line group to develop its own life and history Welcome shared language, metaphors, rituals and jokes	2.2903	1.09225	0.604	0.755
94. Be reflective to understand how their students learn, adapt the teaching environment	2.4516	1.05080	0.433	0.661
81. Encourage group members to question theory and practice	2.2903	1.03047	0.550	0.656
18. Social relationship, friendly attitudes must be encouraged, collaborative work should be done to increase learners' interaction and instructors must assist students	1.9839	0.98334	0.536	0.617
82. Encourage group members to lead discussions	2.5645	1.04992	0.753	0.613
111. Flexibility of Time and Location	2.4516	1.21030	0.602	0.612
78. Lead a round of introductions with perhaps, an on-line ice-breaker	2.3871	1.06131	0.656	0.610
93. Feedback and motivational skills	2.5806	1.12422	0.705	0.566
32. Collaborative learning strategies require more interaction	2.0323	0.84868	0.556	0.502
Interaction behaviour: *α=0.92*				
101. Facilitator contribute to build up a positive, constructive,	2.3871	1.07665	0.446	0.744
100. Be flexible to adapt new learning style	2.4194	1.18111	0.594	0.707
66. Encourage discussions	2.3226	0.90126	0.589	0.651
162. Online courses do not exist in isolation	2.1290	0.91408	0.484	0.630
103. Lecturers presence in online groups is important to students that active participation is the most important factor influencing the success of online groups	2.4032	1.06293	0.614	0.602
116. Promote human interaction	2.6129	1.10668	0.466	0.588
64. Assign roles and responsibilities	2.1129	0.85132	0.554	0.584
89. Establish an online identity as e-moderator	2.3065	1.08021	0.618	0.568
91. Build online teams	2.5161	1.06728	0.719	0.535
Barriers: *α=0.89*				
123. There is the lack of support for the changing roles of students	2.6452	1.10285	0.507	0.861
121. There is lack of technological assistance	2.7097	1.21988	0.520	0.823
122. There is lack of adequate time-frame	2.6935	1.15359	0.645	0.817
124. Tension between teacher and student control of the online	2.4677	1.01977	0.413	0.815
120. Be a team player, communication skills, and deliver mechanism.	2.5484	1.00290	0.621	0.617
Capacity for interaction: *α=0.73*				
47. Students expect an e-learning system to be dependable and user friendly	2.3387	1.10057	0.311	0.846
29. Understanding of the attitudes, experiences and dynamics of interaction of students is considered by highlighting the significance	2.2258	1.12234	0.326	0.846
48. Availability and access to a common ground in a computer -mediated discussion is necessary to sustain instructional interaction over the entire length of the discussion. Instructional dialog takes	2.6290	1.07481	0.374	0.629
27. Students' collaborative engagement with new technologies heighten understanding of influential factors shape the effectiveness of peer interactions, learning contexts and computer interfaces for enhancing learning from a socio-cognitive perspective	2.3226	1.14196	0.233	0.603
8. A capacity for relationship building	2.4194	1.10955	0.483	0.557
Group interaction: *α=0.68*				
55. Participants learning require two kinds of interaction with course content and other participants	2.1452	0.80667	0.336	0.761
54. Online learning groups often can develop their strong identity	1.9677	0.92271	0.356	0.722
158. Absence of real-time feedback	2.2581	1.07025	0.456	0.536

DOES SCREENCAST TEACHING SOFTWARE APPLICATION NEEDS NARRATION FOR EFFECTIVE LEARNING?

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ABSTRACT
The aim of this study was to investigate the effects of screencast with narration and without narration in enhancing learning performance. A series of screencast teaching Flash animation software was developed using screen capture software for the purpuse of this research. The screencast series were uploaded to specialized channels created in YouTube video sharing platform. The study was conducted under the online self-paced learning condition. A pre-test post-test experimental design was used involving two different groups that studied the two different strategies. Data collected were analyzed using one-way ANOVA test. The results indicate that screencast with narration was significantly more effective than screencast without narration in enhancing students' learning performance. Moreover, from the observation, it was revealed that screencast with narration, published and shared online, can be a potential strategy in reducing learning duration. Taken together, the findings provide evidence that screencast with narration can be used for online self-paced learning that is not only effective but also efficient.
Keywords: Digital video, learning, narration, online, screencast, screen capture, video sharing

INTRODUCTION

The emergence of video sharing technology in internet world is fascinating. The technology offers great choice for users throughout the world to share their videos online. The audience for online video sharing such as YouTube and Google Video shows continues growth across all demographic groups, far outpacing the adoption rate of many other internet activities (Madden, 2009). Furthermore, high speed broadband connectivity initiative enables fast uploading and downloading for smooth viewing experiences of these online video contents. Capitalizing on all of these advancements, efforts to harness the benefits of video sharing in online education are becoming more and more imperative as it has opened a new channel for teaching and learning process - benefiting both the educators and students.

Video technology is a rapidly evolving technology that continues to be used overzealously in education; however, there are relatively few empirical evaluations on the effective use of video for learning vis-a-vis other computer-aided instructions as shown in Table 1 (Schwartz & Hartman, 2007). Thus, the need for research to investigate the effectiveness of this technology in education especially on the instructional design issues and implementation methods is not only important, but also urgently needed (Snelson, 2008).

Table 1: Percentage of Journal abstracts that indicate research on video-aided and computer-aided instruction, as found in the ten issues prior 2005

Journal Title (Number of abstracts)	Video-aided learning	Computer-aided learning
Cognition and Instruction (n=31)	3.2%	25.8%
Educational Technology Research and Development (n=56)	3.6%	57.1%
Journal of Educational Psychology (n=159)	2.5%	9.4%
Journal of the Learning Sciences (n=31)	9.7%	61.3%
Learning and Instruction (n=48)	6.3%	16.6%

Source: (Schwartz & Hartman, 2007)

Digital Video

The meaning of video is the display of images on a television-type screen (Heinch, Molenda, Russel & Smaldino, 1996). Originally, the concept of video was synonymous with that of broadcast television, but the concept has expanded tremendously with the presence of digital technology. Digital technology has allowed video to be created and viewed on devices such as laptop, personal computer and cell phone. Today, further development of streaming media technology and increasing number of people having access to high speed broadband services have made the internet a suitable and popular channel for distribution of video-based materials for learning purposes (So, Lossman, Lim & Jacobson, 2009).

Digital video content is easier to develop than traditional video production. There is no need of high-tech cameras and production studio with expensive equipment anymore. Nowadays, a small digital camcorder or even a cell phone camera is perfect for capturing quality live shoots. Through user-friendly video authoring software, editing, combining or rearranging multiple video clips are performed with ease on personal computers, laptops and even cell phones. Furthermore, animation software can easily create animation videos; and screen recorder software can easily transform screencast into 'know-how' videos.

In terms of user control, digital video players allow teachers and students to control video viewing through functions such as speed up, slow down, pause, reverse, and replay that help prompt review and analysis of the digital contents (Bell & Bull, 2010). As for learning, allowing user-control is essential for effective cognition and reasoning (Ahmad Zamzuri, 2007).

Online Video Sharing Platform

With today's online video sharing technology, users have tremendous opportunity to study virtually anything, anywhere. Users can now find an online video on any topic and learners are beginning to use this technology as a reference tool (Helft, 2009; Iskold, 2008). However, most of the video sharing sites available are not primarily educational (Snelson, 2008). Undeniably, there are millions of short video segments available online that can be tapped on, but allocating and identifying their educational properties pose many challenges to users. Therefore, the development of specialized video sharing sites with educational values is essential. Specialized video sharing sites can improve learning by eliminating any distractions from irrelevant contents. However, many obstacles lie ahead such as developing an online video sharing site from scratch is complex and outsourcing the development is costly. Therefore, open source products can be the potential substitutes for organisations lacking adequate funding. There are dozens of open source video sharing applications that can be downloaded from the internet, for instance phpMotion, ClipBucket, VidiScript and others. Furthermore, there are even free-hosted ready applications such as BoostCast that can be used. However, installing these products can be technically demanding – entailing expert advice or assistance. In addition, not many web-hosting services are video sharing compatible; thus, hosted ready video sharing sites such as YouTube and Google Video remains as preferable choice among users.

Digital Video and Cognition

The educational value of videos lies in its dynamic visual representation that can be used effectively to show screencast, places, implied processes, storytelling and many more benefits. They can be played silently or applied in combination with audio tracks. When used in a correct manner and combination, video's role as dynamic visual representation might be a powerful tool in enhancing teaching and learning outcome (Montazemi, 2006).

In developing digital video content for learning, teachers need to take into consideration the role and limitations of students' cognitive ability. They need to understand how videos can be used to foster learning, and they should design and develope the materials not from the teacher's perspective, which may risk losing learners' attention and engagement. Therefore, an understanding on how video presentation affects students' learning requires a depth analysis of how it is processed in the human memory structure.

Learning is a process of receiving, processing, coding, storing and retrieving information from memory structure (Lin & Dwyer, 2004). Human memory structure is divided into three processing categories namely sensory memory, short-term memory and long-term memory (Atkinson & Shiffrin, 1971; Mayer, 2001). These memories are limited in terms of capacity and duration. Therefore, not all the information entered the memory structure will be registered in long-term memory structure in schema form (Chandler, 1995). Information entered into the memory structure is processed through two different channels; visual channel that processes visual information such as picture, and verbal channel that processes verbal information such as narration and text (Paivio, 1986; Mayer, 2001). Since human memory is limited in terms of duration and capacity, placing a high cognitive load on one channel may reduce the effectiveness of presentation. By presenting material in a form that involves both channel will reduce the cognitive overload in each channel and the presentation will be more effective (Mayer, 2001). Based on this multimedia dual coding theory, video with adequate verbal support is supposed to be more effective in assisting students' cognition.

Notwithstanding the strong arguments and theoretical support, research findings on the effectiveness of digital video for learning remain inconsistent (DeVaney, 2009; Dupagne, Stacks & Giroux, 2006; Veronikas & Maushak, 2005). Some findings seem to suggest that video is only suitable as an additional tool to support students' understanding only on certain topics, and not across the entire curricula (DeVaney, 2009; Montazemi, 2006). Inconsistencies of the findings may be partly attributed to improper design of the video materials and the failures of the developers to take into consideration the limitations of human cognition in their design. For the latter, arguably many developers have failed to pay greater focus on the potential cognitive overload caused by information being presented too much and too quickly, or by the simultaneous appearance of moving elements, narration and on-screen texts in their design that may impede learning (Bell & Bull, 2010; Mayer, 2002).

Thus, this study was carried out to identify the design principles in presenting instructional video that would assist students' cognition in learning. Three main principles that were identified and employed in the design and implementation are as follows:

i. For effective pedagogy and avoiding distractions, the video segments are kept short and simple with not longer than 10 minutes (Vest, 2009a, 2009b).
ii. Utilizing user-control function that comes with the digital media players, which is essential for successive learning (Ahmad Zamzuri, 2007).
iii. Utilizing rehearsal with the replay function that comes with the digital media players for better registration of information in long-term memory (Klein, 1996; Gagne, 1985)

However, a pertinent question arises on the need of verbal support such as narration if the above-mentioned principles were to be employed in the video development and implementation. Even though the dual coding theory proposes that the inclusion of verbal element to support visual element is helpful in terms of reducing cognitive overload, the additional narration does not always support learning (Jeung, Chandler & Sweller, 1997; Fenrich, 1997). With short and simple video and utilization of user-control and rehearsal functions, the video might promote successful learning even without verbal support. Therefore, the primary objective of this study was to investigate the effectiveness of instructional video with narration and without narration in promoting and enhancing learning.

Screencast Teaching Software

It is not uncommon to hear an instructor complaining that a software application is not working or a student commenting on how an instructor does not know how to use the software (Folkestad & De Miranda, 2002), which explains why many instructors avoid using computer applications for teaching or demonstrating their lessons (Zhao & Cziko, 2001). Thus, the short video tutorials developed and shared online may be useful additional resource for teachers and students in learning software functions. Screen capture software is a perfect tool for creating these short video segments. Screen capture software such as Camstudio, Camtasia, Robodemo and others have the capability to capture movements appearing on the computer screen. Furthermore, it has the capability to include narration and text for verbal explanation of the processes involved. The compelling capabilities afforded by the software serve as a potent tool to create video segments showing critical software functions (Wulf, Kafala, Waldrop et. al., 2005; Folkestad & De Miranda, 2002). Taking cognizance of the educational potentials of the visual and verbal representations, this study was carried out that focused on examining the effects of screencast on students' learning achievement through the teaching of software functions with and without narration support.

METHOD

Research question

Based on the discussion above, the primary research question of this study is as follows:

Is there a significant difference between screencast with narration and screencast without narration on students' online learning performance?

Learning Materials

Two groups of videos consisting of six screencast series were created with Camtasia Studio screen capture software for the research. The screencast series were used for teaching Flash animation software functions which consists setting the screen properties, introduction to timeline, drawing tools, creating keyframe and frame, creating motion tween and saving the output (Figure 1). The first group comprised a screencast series without narration and the second group was the same screencast series, but included with narration. The screencast series duration ranged from one to two seconds.

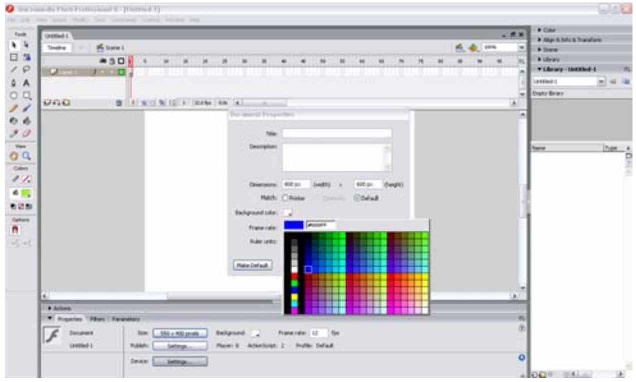

Figure 1: Screencast teaching Flash software

The screencast series developed was uploaded to two separate channels namely MOVIEDU1 and MOVIEDU2 created in YouTube (Figure 2). Two new channels were created to avoid any distraction from any unrelated videos throughout the study that may influence the learning outcome. The first channel contains screencast series without narration and the second channel contains screencast series with narration.

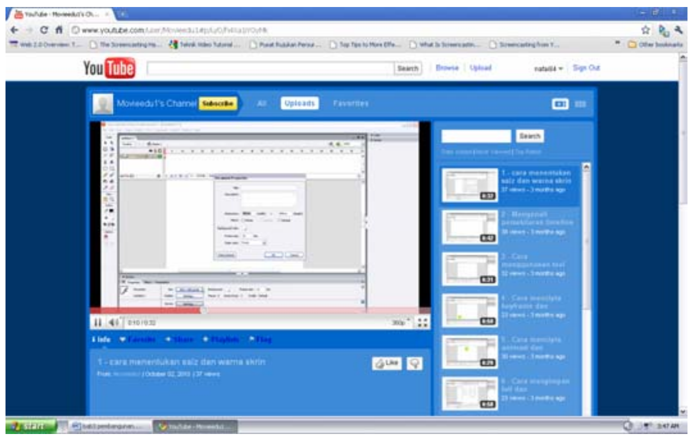

Figure 2: MOVIEDU1 channel

Test Instruments

Pre-test and post-test were used on the two groups that studied the two different screencast presentation strategies respectively. Pre-test and post-test were hands on test that required students to create an animation of bouncing ball by following the specific properties assigned. Grades were given based on how accurate students employ the required properties in their design. The pre-test was conducted before the learning process and the post-test was conducted immediately after the learning process.

Procedures

The research sample comprised 45 undergraduates drawn from two intact classes, whose ages ranged from 21 to 25 years and, enrolled in a Diploma in Education course. The study was conducted separately for both groups. Pre-test to identify students' prior knowledge consistency of the content was conducted before the study. Fifteen minutes were given for them to complete the task. Immediately after the pre-test, the two groups explored the two different screencast presentation methods that were with and without narration. They were first briefed on how to access and use the materials in the respective channels. Students were also encouraged to utilize the user-control elements in the video player throughout the study. Approximately, 30 minutes were allocated for them to complete the study. Four research assistants helped the researchers monitor the students to ensure that the latter comply with the procedures of the study. Upon the completion of the tasks, a post-test was conducted that lasted for fifteen minutes. One-way ANOVA test was used to analyze the data collected from the pre-test and post-test.

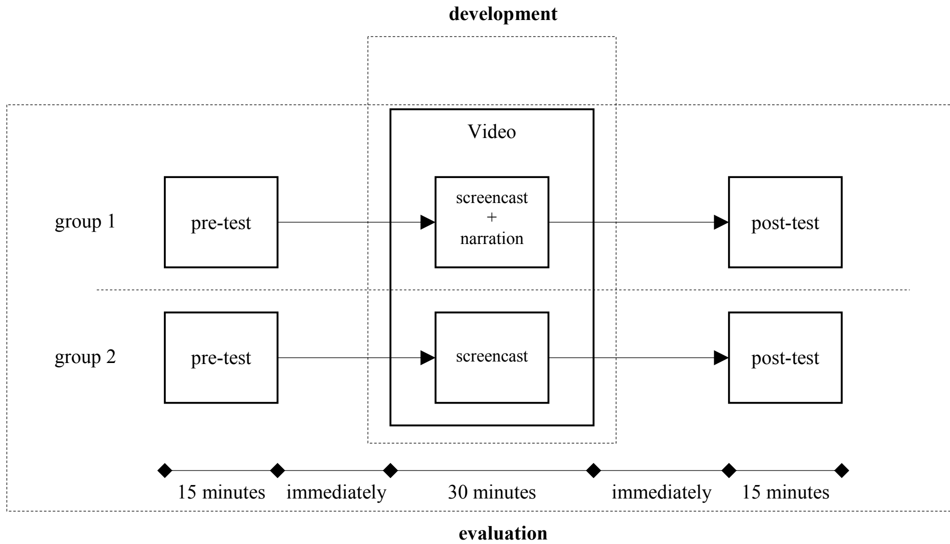

Figure 3: Research Framework

RESULTS

Consistency of prior knowledge was determined through the pre-test results. From the one-way ANOVA test, Levene's test for homogeneity of variances is not significant ($p>0.05$) and therefore the population variances for each group are approximately equal. The output shows that there is no significant difference in the pre-test achievement of students in screencast without narration and with narration strategies $F(1,43)=0.15$, $p>0.05$. This result further assured that there is no pre-existing difference in prior knowledge by group. Total mean scores of prior knowledge are also obviously low ($M=7.22$, $SD=8.57$), which is necessary for the study.

Students' achievement was determined through the post-test results. From the one-way ANOVA test, Levene's test for homogeneity of variances is not significant ($p>0.05$) and therefore the population variances for each group are approximately equal. The output shows that there is significant difference in the post-test achievement of students in screencast without narration and with narration strategies $F(1,43)=16.62$, $p<0.05$.

Mean scores indicate that students in the screencast with narration strategy ($n=22$, $M=76.14$, $SD=16.25$) obtained better mean score than those students in the screencast without narrataion strategy ($n=23$, $M=52.09$, $SD=22.65$). The results indicate that screencast with narration was better than screencast without narration in enhancing learning performance.

DISCUSSION

With the emergence of online video sharing technology, learners can have the opportunity to learn in conducive learning environments that are both visually appealing and cognitively compelling. When used appropriately and judiciously, video being a dynamic visual representation plays a potential role in assisting learning. However, it appears that research findings with regard to the effectiveness of digital video on learning have been inconsistent (DeVaney, 2009; Dupagne, Stacks & Giroux, 2006; Veronikas & Maushak, 2005). The main reason of these inconsistencies may be attributed to the design limitations particularly due to some of the developers' poor grasp on the theoretical underpinnings that may impact learners' cognition (Bell & Bull, 2010; Mayer, 2002). Keeping the video short and simple, and encouraging learners to fully utilize the control functions in the digital video player may have a positive impact; learners' cognitive overload can be minimized throughout the learning process, which is essential for successive learning. However, question arises on the need of verbal element to support the visual display of video that employs these development and implementation principles. Thus, this study has investigated the effectiveness of digital video, specifically instructional screencast teaching software with and without narration on students' achievement. The finding shows that students in the instructional screencast with narration strategy obtained better mean scores than students in the instructional screencast without narration strategy. This suggests that narration supported in the instructional screencast had been very helpful for successful learning, especially for learners with low prior knowledge in this study, which concurs with Mayer's (2001) dual-coding assumption. Screencast with narration that utilize both visual and verbal channel in the memory structure can attenuate cognitive overload resulting in effective learning as pointed out by Mayer (2001). Since this study only focused on narration as a verbal element, further study is warranted to investigate the effectiveness of text as verbal element on learning as informed by the dual-coding assumption, specifically in the instructional screencast design.

The finding of this study that involved the learning of software functions also suggests that screencast with narration can reduce the learning duration. In the conventional condition, instructors usually needed three to four hours lab sessions to ensure the students master the respective skills. However, in this study the students were able to complete the task given within 15 minutes even with 30 minutes exploration in self-paced online learning condition. This particular finding indicates that short and simple instructional screencast, specifically with narration can be an ideal tool to support online self-paced learning, notwithstanding some of the research findings that suggest that video is only suitable as an additional tool to support students as pointed out in DeVaney (2009) and Montazemi (2006),

Another highlight of this research is that the students were able to complete the entire basic tasks as requested. However, based on the observation, they seem have some difficulty in completing motion tweening task, especially students in screencast without narration strategy. Motion tweening can be considered as complex task in learning Flash animation software, especially for students with low prior knowledge. Therefore, further study in finding design solutions in presenting complex contents in learning software also seems important.

CONCLUSION

Development of instructional screencast is relatively time-consuming. Therefore, to ensure that instructional screencast used in learning to be effective, instructional designers should ground their designs based on current research findings and theories. They should not base their designs on their own preferences, which may or may not work well. Thus, the findings from this research suggests that short and simple screencast with narration support has an advantage in promoting better learning, especially for students with low prior knowledge. This category of students is mostly not highly competent in encoding rich and complex information, as they may arguably lack refined and highly networked mental schemas that can lead to cognitive overload. Carefully crafted visual and verbal representations through narrative video serve as a cognitively compelling mechanism as complex and dynamic learning concepts can be dually represented on two complementary channels, which increase better integration with their existing mental schemas leading to meaningful learning experience – thus, a better understanding and knowledge. Further study is warranted to explore the impacts of other multimedia elements on learning particularly on the effects of text as verbal information via the promising instructional screencast design strategy. Another focus that may interest researchers is the examination of this learning tool on higher taxonomic level of cognition.

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REFERENCES

Ahmad Zamzuri M. A. (2007). *Kesan Koswer Pelbagai Strategi Animasi Kawalan Pengguna Terhadap Prestasi Kognitif dan Ketekalan Pelajar (The Effects of Various User-Controlled Animation Strategy Courseware on the Students' Cognitive and Retention Skills).* Doctor of Philosophy Thesis (unpublished). Pulau Pinang: Universiti Sains Malaysia

Atkinson, R. C., & Shiffrin, R. M. (1971). The control of short memory. Scientific American. In Klein, S.B. (1996). *Learning principles and applications* (3rd ed.) (82-90) New York: McGraw Hill.

Bell, L., & Bull, G. (2010). Digital video and teaching. *Contemporary Issues in Technology and Teacher Education, 10*(1). Retrieved April 2, 2010 from http://www.citejournal.org/vol10/iss1/editorial/artical1.cfm

Chandler, P. (1995). *Is conventional computer instruction ineffective for learning?* Retrieved December 11, 2004 from http://www.educationau.edu.au/archives/cp/REFS/chandler.htm

Dehlin, J. (2007). *Video and open content.* Retrieved April 7, 2010 from http://ccnmtl.columbia.edu/opencontent/may23/video_and_open_content.html

DeVaney, T.A. (2009). Impact of video tutorials in an online educational statistics course. *MERLOT Journal of Online Learning and Teaching, 5*(4), 600-608.

Dupagne, M., Stacks, D.W., & Giroux, V.M. (2006). Effects of video streaming technology on public speaking students' communication apprehension and competence. *Journal of Educational Computer Technology Systems, 35,* 479-490.

Fenrich, P. (1997). *Practical guidelines for creating instructional media applications.* Orlando: The Dryden Press.

Folkestad, J.E., & De Miranda, M.A. (2002). Impact of screen-capture based instruction on student comprehension of Computer Aided Design (CAD) software principles. *Journal of Industrial Technology, 18*(1).
Gagne, R.M. (1985). *The conditions of learning* (4th ed.). NY: Holt, Rinehart & Winston.
Helft, M. (2009). *Is YouTube the next Google*. Retrieved April 5, 2010 from http://www.nytimes.com/2009/01/18/technology/18iht-ping.1.19448468.html
Heinich, R., Molenda, M., Russell, J.D., & Smaldino, S.E. (1996). *Instructional media and technologies for learning* (5th ed.). Upper Saddle River, NJ: Prentice Hall.
Iskold, A. (2008). *Is YouTube the next Google.* Retrieved April 5, 2010 from http://www.readwriteweb.com/archives/is_youtube_the_next_google.php
Jeung, H., Chandler, P. & Sweller, J. (1997). The role of visual indicators in dual sensory mode instruction. *Education Psychology, 17,* 329-343.
Klein, S.B. (1996). *Learning principles and applications* (3rd ed.). NY: McGraw Hill.
Lin, C.L., & Dwyer, F. (2004). Effect of varied animated enhancement strategies in facilitating achievement of different educational objectives. *International Journal of Instructional Media, 31*(2), 185-199.
Madden, M. (2009). *The audience for online video-sharing sites shoots up.* Retrieved April 8, 2010 from http://www.pewinternet.org/Reports/2009/13--The-Audience-for-Online-VideoSharing-Sites-Shoots-Up.aspx
Mayer, R.E. (2002). Cognitive theory and design of multimedia instruction: An example of the two-way street between cognition and instruction. *New Direction in Teaching and Learning, 89,* 55-71.
Mayer, R.E. (2001). *Multimedia learning.* Cambridge: Cambridge University Press.
Montazemi, A.R. (2006). The effect of video presentation in a CBT environtment. *Journal of Educational Technology and Society, 9*(4), 123-138.
Paivio, A. (1986). *Mental representation: A dual coding approach.* Oxford: Oxford University Press.
Schwartz, D. L., & Hartman, K. (2007). It is not television anymore: Designing digital video for learning and assessment. In Goldman, R., Pea, R., Barron, B., & Derry, S.J. (Eds.), *Video research in learning science* (pp. 349-366). Mahwah, NJ: Lawrance Erlbaum Associates.
Snelson, C. (2008). Web-based video in education: Possibilities and pitfalls. *Proceedings of the Technology, Collages & Community Worldwine Online Conference,* 214-221.
So, H. J., Lossman, H., Lim, W. Y., & Jacobson, M.J. (2009). Designing an online video based platform for teacher learning in Singapore. *Australian Journal of Educational Technology, 25*(3), 440-457.
Veronikas, S. & Maushak, N. (2005). Effectiveness of audio on screen captures in software application instruction. *Journal of Educational Multimedia and Hypermedia, 14*(2), 199-205.
Vest, J. (2009a). *Six steps to creating high quality video training.* Retrieved Mac 26, 2010 from http://www.learningsolutionmag.com/articles/185/six-steps-to-creating-high-quality-video-training
Vest, J. (2009b). *7 sins of online video instructional design.* Retrieved Mac 26, 2010 from http://www.worldeducationcouncil.org/2009/05/25/7-sins-of-online-video-instructional-design/
Wulf, T., Kafala, T., Waldrop, L., Prakash, S., Geonetta, S., & Marsh K. (2005). Training faculty to create and use web-based digital audio and video content for instruction. *Frontiers in Education Conference, 2,* F1H-13.
Zhoa, Y., & Cziko, G.A. (2001). Teacher adoption of technology: A perceptual control theory perspective. *Journal of Technology and teacher Education, 9*(1), 5-30.

EFFECTS OF AN ONLINE RATIONAL EMOTIVE CURRICULUM ON PRIMARY SCHOOL STUDENTS' TENDENCIES FOR ONLINE AND REAL-WORLD AGGRESSION

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ABSTRACT
This study investigated the relationship between online and real-world aggressive behavior among primary school students as well as the effects of an online rational emotive curriculum on reducing the tendency of students to display aggression online and in the real-world. We developed an online information literacy course integrated with rational emotive behavior therapy (REBT) to reduce aggressive behavior, using online incidents of hostility as instructional material. An experiment was conducted on four intact Grade 5 classes comprising 67 students using rational emotive curriculum. Control groups comprising 63 students took the same course without the rational emotive curriculum. All of the students participated in one class per week for six weeks consecutively. Our results indicated: (a) a moderate correlation between online and real-world aggressive behavior among primary school students; and (b) the online rational emotive curriculum had a significant effect alleviating aggressive behavior among students with strong hostile tendencies.
Keywords: rational emotive behavior therapy, aggressive behavior, online incidents of hostility, online rational emotive curriculum

INTRODUCTION

With the dawn of the information age, online interaction has become an important aspect of education among children and adolescents (Liu & Chang, 2010; Yagci & Caglar, 2010). Online interaction has both positive benefits as well as negative consequences (Chang, Liu, Lee, Chen, Hu, & Lin, 2011; Chen, Liu, Shih, Wu, & Yuan, 2011; Chiang, Lin, Cheng, & Liu, 2011; Hou, 2010; Liu, Lin, & Chang, 2010; Liu & Lin, 2007; So, 2010; Yagci & Caglar, 2010), enabling participants to exchange ideas freely, thereby attracting others to join the discussion and deepen the understanding of the topic (Hou, 2010; Liu & Chang, 2010; Liu & Lin, 2007). Aggressive behavior is found not only in real-life situations but also online (Yagci & Caglar, 2010) in the form of "flaming", and this type of behavior has seen a dramatic increase following the development of internet technologies. Due to the irrationality of online aggressive behavior, most research on this topic has investigated the causes of such behavior as it relates to the use of technology (Yagci & Caglar, 2010). A few studies have examined the psychological processes associated with online aggression, aiming to develop measures with which to predict, prevent, and treat such behavior (Lin & Hwang, 2005). Although these studies have shed some light on the issue of correcting online aggressive behavior, they have focused primarily on addressing the behavior directly.

Many aggressive outbursts in everyday life are the result of a lack of appropriate instruction, and have been found to be closely related to cognition and emotional factors (Ellis, 2001). Education related to the prevention of such behavior must address cognitive processes, emotional responses, and behavioral patterns. Ellis's (2001) stated that aggressive behavior is generally not caused by the event itself. Negative emotional responses can be mitigated through self-change, self-correcting beliefs, and internal self-persuasion. To prevent aggressive behavior, Ellis (2001) proposed rational emotive behavior therapy (REBT), which assumes that the emotions of troubled individuals are the result of events with corresponding thoughts, feelings, and behavioral patterns (Ellis, 2000, 2001; Gonzalez et al., 2004). In other words, negative emotions and aggressive behavior can be decreased by self-correcting thinking and internal self-persuading language. In this manner, negative behavior can be transformed into positive thinking and constructive discussion (Gonzalez et al., 2004).

Rational emotive behavior therapy (REBT) was originally applied as a form of psychotherapy with which to alter dysfunctional thoughts, emotions, and actions in real-life situations. Recently, REBT has been adopted by researchers to tackle the issues of online aggressive behavior and internet addiction among adolescents (Ko et al., 2009), and address the relationship between internet addiction and belief of frustration intolerance in gender difference (Ko et al., 2008). Nonetheless, the question of whether a link exists between real-life and online aggression remains unanswered. In addition, determining the means by which to prevent online misbehavior among children and adolescents has not been adequately addressed, particularly with regard to cognitive processes, emotional responses, and behavioral patterns. Because aggressive behavior in childhood and adolescence is a risk factor for violent behavior in adults (Huesmann, 2007), it is crucial to develop measures for the prevention of aggressive behavior at an early age.

In light of the above issues, the aim of this study was to develop an online curriculum applying the concept of REBT for use in blogs as part of a literacy course aimed at primary school students. An online learning environment was created with the express purpose of altering cognitive beliefs, countering irrational emotional responses, and establishing a rational system of values. In such an environment, students would be able to face online hostility, and learn to think critically about the information they obtain online. It is expected that this could alleviate the generation of online hostile behavior making online discussions a bastion of rationality and positivity. The study sought to discover the following:

a. Whether a linkage exists between online and real world aggressive behavior among primary school students;
b. To determine the effectiveness of an online curriculum based on REBT for the prevention of aggressive behavior among primary school students.

HOSTILITY AND AGGRESSION

Hostility is the result of a negative evaluation of an entity. Psychologically, hostility is closely related to aggression. Hostility includes a predisposition towards aggressive behavior, expressed mainly through insults, the destruction of objects, and the infliction of harm. “Aggression implies a further step, in the sense that it includes the appearance of behaviors that may be destructive, harmful or punitive when directed to other people or objects” (Ramírez & Andreu, 2006, pp. 280–281). In many cases, hostility is the result of a divergence between the beliefs and concepts of one individual and those of others. An inability to adjust imbalances in one’s cognition leads to feelings of anger, which in turn trigger aggressive behavior. In general, hostility is a result of a negative cognitive understanding, an emotional response, or a specific physiological phenomenon. Hostility operates at a negative cognitive level, an angry emotional level, or an aggressive response level; however, aggressive behavior is not an inevitable response when confronted with hostility (Berkowitz, 1998). Berkowitz (1998) proposed a cognitive neo-associative conception of anger to explain how people respond to negative feelings. Based on this proposal, anger represents the emotional response of an individual to a negative incident. The individual initially processes this incident by either attacking or escaping. It is easy to escape if one feels “fear,” whereas the emotion of “anger” leads to an angry counterattack. A feeling of anger is not necessarily related to an individual; any negative event can trigger anger (Berkowitz, 1993, 1998).

Aggression is intended mainly to cause harm to other people, with an immediate purpose of hurting the other person. Derlega and Janda (1986) maintained that the intent of aggression is for individuals to protect one’s territory and the members of one’s in-group or for leaders to ensure the survival of their group. In social psychology, intentional aggression includes angry retaliation, self-defense, and purposeful acts of violence. These behaviors can be classified into two categories according to their goals (Derlega & Janda, 1986; Geen, 1998):

(a) Affective aggression—Aggression has a fixed target and is deliberate, with intent to do physical or mental harm. The goal or reinforcement is to inflict pain or suffering on the victim. This is also called angry aggression, emotional aggression, response aggression, or hostile aggression.
(b) Instrumental aggression—Aggressive behavior is used as a means to seize goods, status, or to achieve objectives.

Geen (1998) described a process of affective aggression and the factors influencing it. Apart from the hostile event that triggers aggressive emotions, *previous experience, social learning, and background* factors may also contribute to aggressive behavior. These are the factors established prior to a demonstration of aggressive behavior, which may also influence changes in the process of cognition among individuals (Geen, 1998). A great deal of evidence has indicated that non-action responses often occur in conjunction with affective aggression, including hostile cognition, angry emotion, and physical responses; and emotional responses may lead to the attack of an available target (Berkowitz, 1998). Other studies on affective aggression have categorized the factors influencing aggressive behavior as individual factors and environmental factors (Geen, 1998; Bandura, 1986). Individual factors refer to the intrinsic characteristics of an individual leading to aggressive behavior, including influences of gender, personality, and socialization. Environmental factors refer to influences from the external environment causing individuals to exhibit aggressive behavior, including provocation, alcohol, weapons, violence in media, anonymity, and even the weather.

When individual are faced with offensive and discomforting situations online, their emotional response following hostile cognition is considered affective aggression. It is not an instrumental aggression that aims at achieving benefits. In this study, aggression refers to affective aggression.

ONLINE HOSTILITY AND AGGRESSION

In their study on online hostility among college students, Lin and Huang (2005) defined online hostility as "sensing of malicious intention or unfair event, and mainly a cognitive component of aggression . . . a response of negative tendency or unfair treatment, mostly regarded as an attack of the cognitive component." Offensive online behavior resulting in negative cognition, emotion, or behavior among other people, such as anger, aggression, neglect, and fear are considered the primary source of online hostility. The characteristics of the internet may contribute to dissocial or anti-social behavior among online users, which, in turn, triggers online hostile behavior. Many characteristics of the internet, such as text-based communication, anonymity, lack of social cues, and network communication, reduce the level of self-awareness, self-control, and even the cognitive capability of individuals when online (Derks, Bos, & Grumbkow, 2007). In this manner, negative attitude, beliefs, judgments, and other hostile emotions toward other people can be directly expressed online, hurting other people and producing dissocial or anti-social behaviors.

The most common form of online hostile behavior is "flaming". Flaming refers to speaking incessantly online with what appears to be a ridiculous attitude on an uninteresting topic, which produces unrestrained behaviors in the hacker society (Thompsen, 1993). Flaming is also defined as "hostile, insulting language in computer-mediated communication" (Wang & Hong, 1995, p. 1). The term flaming is a rather extensively used with regard to negative anti-social behavior on the internet. It is also viewed as a component of social emotion, including the expression of hostility, the use of profane words, and the release of strong emotions, which are unrestrained (Thompsen, 1993; Thompsen & Foulger, 1996). People flame when others violate the rules of internet culture, when there is ethnocentrism, and when people misunderstand one another (Wang & Hong, 1995).

In recent years, various forms of flaming have evolved, and cyber-bullying is one of them. Cyber-bullying refers to the behavior of threatening other people through words on either the internet or other related platforms (Li, 2007). Thompsen and Foulger (1996) assumed that flaming has its own developmental stages, and classified flaming into the following five patterns at different stages:

(a) Divergence—At least two different opinions exist with regard to a single problem or particular topic of discussion.
(b) Disagreement—Participants provide direct evidence to support one's own arguments against others. This is merely disagreement without attacking other people's opinions.
(c) Tension—The participant criticizes the opponent's argument by overstating their own beliefs.
(d) Antagonism—The participant attacks the opponent by exposing the opponent's name and personal characteristics, and damaging the opponent's credibility without paying particular attention to the issue of debate.
(e) Profane antagonism—The participant expresses excessive hostility, aggressive behavior, verbal profanity, arrogant words of attack, and mischievous complaints, which is divergent from the original topic, and merely ignoring the original disagreement in the discussed topic.

According to the developmental patterns associated with flaming (Thompsen & Foulger, 1996), an examination of flaming in academic mailing lists (Wang & Hong, 1995), and the cognitive neo-associative concept of anger (Berkowitz, 1998), information conveyed through hostility often shifts the opinions of internet users, thereby creating hostile feelings toward the information. This, in turn, generates anger, hostility, and aggression or causes it to be simply ignored. Different responses caused by the hostile information are generated, according to the previous life experience, personal characteristics, network properties, and environmental factors of the internet user.

Differences in response patterns lead to related discussion strings on the internet. In the discussion string, internet users can observe, learn from, and influence one another, contributing to higher level cognitive processing. If the discussion is rational, and contributes to a deeper discussion of the topic, we call it rational flaming. However, if the discussion becomes irrational, such as calling people names and making hostile attacks, it is an example of online hostility. If such flaming continues, it leads to “profane antagonism”, causing people to completely ignore the original topic and leading to hostile or aggressive behavior.

In this study, flaming is associated mainly with the use of text messages involving negative or humiliating information when internet users communicate online, which contributes to anger, hostility, and aggression.

RATIONAL EMOTIVE BEHAVIOR THERAPY

Rational Emotive Behavior Therapy (REBT) was proposed by Albert Ellis in 2000, as an evolution of Rational Therapy (RT) from 1955 and Rational Emotive Therapy (RET) in 1961. REBT assumes on the one hand that people have an intrinsic potential for rational thinking; on the other hand, people are prone to direct emotional responses without reasonable judgment, thereby falling into the trap of irrationality. This therapy involves the reconstruction of the self-statements of individuals, resulting in the adjustment of their behavior. REBT is adopted to guide people to examine and alter their fundamental values. Ellis has comprehensively demonstrated the efficacy of the therapy using the “*A-B-C-D-E* approach”. This approach states that in most cases, it is not *A,* the event itself (A, activating event) that contributes to emotional consequences (C, consequences), but rather the associated beliefs (B, beliefs). Through *A*, a disputation (D, disputation) arises, to generate a new effect (E, effective rational outlook). REBT therapy suggests that it is not usually the event itself that causes negative emotions. Negative emotions are also related to corresponding thoughts, feelings, and behavioral patterns (Ellis, 2000, 2001; Gonzalez et al., 2004). In other words, negative emotions can be reduced by self-changing, self-correcting beliefs, and internal self-persuasion, enabling a reduction in hostile behavior, or transforming it into positive thought processes and constructive discussion (Gonzalez et al., 2004).

REBT emphasizes the flexibility of individual beliefs and behavior. The assumption on which the therapy is based is that negative emotions regarding frustration, rigidity, and extreme behavior are generally caused by the creativity and biological tendencies of the individual, although they may also stem from the environment or culture (Ellis & MacLaren, 2005). When one is experiencing emotional pain, he/she is not only affected by the event itself, but also by the fact that it bothers them. According to REBT, people can select whether to be bothered by an event or to moderate negative cognition, emotion, and response through thinking, feeling, and acting (Ellis, 2000, 2001; Gonzalez et al., 2004). In REBT, evaluation is a continuous process. The treatment usually involves diagnosis as a principal method. Using REBT, one can quickly identify adverse events (A) that upset a person the most, the person’s irrational beliefs regarding the adverse event, whether or not the person can realize these irrational beliefs, whether or not he or she can strongly dispute (D) those beliefs, and what effective rational outlook (E) might result in. Gonzalez et al.’s showed that REBT is effective for children and adolescents with or without psychological problems. However, the effects were better for mentally unstable people than for mentally healthy people. The longer the therapy was used, the better the results were. This treatment proved more effective for children than adolescents (Gonzalez et al., 2004).

Although the literature associated with the issues of hostility and aggression has shown that an individual with stronger hostile tendencies is more likely to demonstrate aggressive behavior, in this study, we assumed that a link exists between online and real-world aggressive behavior. By implementing an online curriculum integrated with REBT, individuals are able to develop a positive behavioral response model, thereby decreasing or avoiding aggressive behavior both online and in real life environments.

METHOD

This research was a quasi-experimental study, designed to examine the association between online and real-world aggressive behavior among primary school students. In addition, we studied the effects of an online rational emotive curriculum on reducing the tendency of students to exhibit aggression in both the online and real-world. A rational emotive curriculum was integrated with Rational Emotive Behavior Therapy (REBT) to help reduce aggressive behavior in an online course on information literacy, using online incidents of hostility as teaching material.

PARTICIPANTS

The subjects in this study were from four intact Grade 5 classes A, B, C, and D. The students were offered the opportunity to join an information literacy course using online incidents of hostility as teaching material. Classes A and B with 67 students were randomly assigned the role of experimental group, and Classes C and D with 63 students were randomly assigned the role of control group. The experimental groups were offered an information literacy course combined online rational emotive curriculum, and the control groups received the same information literacy course without online rational emotive curriculum. All of the classes were taught by the same teacher and conducted on the same blog platform (Xuite). All of the students took one class per week for six consecutive weeks.

A questionnaire survey was conducted to divide the experimental and control groups. The students in the four classes were administered the hostile tendency scale (30 questions). An independent-sample t-test was performed on the hostile tendency scores of each class. The average scores of the experimental group and the control group were 61.82 and 65.44, respectively, with insignificant homogeneity in the variance test (F=.13, p=.72). The result was t=-1.94 (not significant), indicating no significant difference in hostile tendencies among the students in the 4 classes. Next, we divided the students into experimental groups and control groups based on the median hostile tendency score of 63.5, with maximum score and minimum score of 92 and 38, respectively. Students in the experimental groups and the control groups were listed on the basis of the scores derived from this scale. Within each group, the students were then divided into sub-groups showing a strong or weak tendency for hostility according to the median score. In consideration of gender and the classes that the students were in, we selected students with similar scores to form experimental and control groups comprising students with a strong tendency for hostility, and experimental and control groups with weaker tendencies. Each group had 6 boys and 6 girls.

INSTRUMENTS

Three instruments were used in the study, covering a hostile tendency scale, real-world aggression scale, and online aggression scale.

Hostile Tendency Scale

The scale initially had 48 questions, which was later reduced to 30 questions through factor analysis. The KMO value was 0.87, indicating that this scale well suited for factor analysis. This explained 57.7% of the total variance. The overall internal consistency reliability (Cronbach's α factor) was 0.88. These 30 questions covered six independent factors including experience with online hostility, witness to online hostility, hostile attitudes, internet characteristics, online interpersonal suspicion, and self-esteem.

Real-world Aggression Scale

The scale initially had 30 questions, which was decreased to 16 questions through factor analysis. The KMO value was 0.94, indicating that this scale very well suited for factor analysis. This explained 56.87% of the total variance. The overall internal consistency reliability (Cronbach's α factor) was 0.91. These 16 questions covered three independent factors, including verbal attacks, physical attacks, and emotional responses to an object.

Online Aggression Scale

The scale initially had 30 questions, which was decreased to 20 questions through factor analysis. The KMO value was 0.90, which indicates that this scale very well suited for factor analysis. This explained 58.42% of the total variance. The overall internal consistency reliability (Cronbach's α factor) was 0.88. These 20 questions covered four independent factors, including verbal attacks, group attacks, expression of anger, and ignoring the rights of other people.

PROCEDURE

Both the experimental groups and control groups used the same blog platform (Xuite) for hands-on blog exercises and were exposed to the same stimulus of online hostility. Children from the control group shared the same accounts for the study, which was equivalent to having partial internet anonymity. The experimental group was provided online rational emotive curriculum adjusted to the information literacy course, enabling students to realize the irrational aspects of online hostile incidents, thereby discovering what kind of thought processes, emotions, and responses these irrational aspects would incite in them and other people. They also learned how to resist irrational responses and seek a more appropriate response to the incident. The control group did not have this training. The teaching hours were the same for all groups (6 classes, 240 minutes in total). To avoid the John Henry Effect and the Hawthorne Effect, the students did not know which group they were in during the entire teaching and testing process. They were informed only after the teaching experiment had been completed.

RESULTS

The Relationship between "Online Aggression" and "Real-world Aggression": Correlation Analysis Prior to Teaching

The four Grade 5 classes were evaluated using scales to determine the level of both online aggression and real-world aggression. The scores for online aggression ranged between 20 and 65, and the scores for real-world aggression ranged between 21 and 43. The average of the two scores was subjected to correlation analysis. Table 1 shows that the Pearson product-moment correlation factor between the two variables was .62, indicating that the variables were significantly correlated. A correlation factor of .70 ~.99 is considered highly correlated, .40~.69 is considered moderately correlated, and .10~.39 is considered in low correlation. According to this standard, online aggression and real-world aggression were moderately correlated with statistical significance prior to instruction.

Table 1 Descriptive Statistics and Correlation Analysis of Online Aggression and Real-world Aggression before Teaching

	Item	N	Mean	SD	r
Online aggression	20	67	2.28	9.65	.62**
Real-world aggression	16	63	1.91	8.85	

**p<.01

After removing the effects of hostile tendencies causing aggression (third variable), the net correlation of the two variables was .53, $p<.001$. This is significant, indicating that these two variables were still moderately correlated with statistical significance.

The Relationship between Online Aggression and Real-world Aggression: Correlation after Teaching

The four Grade 5 classes were evaluated using scales to determine the level of both online aggression and real-world aggression. Scores of online aggression ranged between 27 and 63, and the scores of real-world aggression ranged between 21 and 34. The average of the two scores was subjected to correlation analysis. Table 2 shows that the Pearson product-moment correlation factor between the two variables was 0.46, indicating that they were significantly correlated. Therefore, a moderate correlation existed between online aggression and real-world aggression with statistical significance following completion of the course.

Table 2 Descriptive Statistics and Correlation Analysis of Online Aggression and Real-world Aggression after Teaching

	Item	N	Mean	SD	r
Online aggression	20	67	2.21	7.37	.46**
Real-world aggression	16	63	1.86	7.79	

**p<.01

After removing the effects of hostile tendency causing aggression (third variable), the net correlation of the two variables was 0.40, $p<0.001$. This is significant, indicating that these two variables were still moderately correlated with statistical significance.

The tests before and after teaching show that online aggression and real-world aggression of elementary school students were moderately correlated with statistical significance. The correlation was still significant even after the effects of hostile tendencies were excluded.

Online Rational Emotive Course and Decrease in Overall Aggressive Tendencies

The average score on the 20-question online aggression scale and the 16-question real-world aggression scale for each of the 48 selected students were summed to determine the average scores. After subtracting the inconsistency caused by different numbers of questions in the two scales, we obtained average aggression scores for each student.

The average aggression scores for the students in the groups with strong and weak hostile tendencies before and after the course were subjected to descriptive analysis. The compiled results are shown in Table 3.

Table 3 Descriptive Statistics of Aggression Score of before Teaching and after Teaching

Hostile tendency	Group	N	Before teaching		After teaching	
			Mean	SD	Mean	SD
High	Experimental	12	2.38	.52	2.12	.43
	Control	12	2.46	.44	2.41	.34
Low	Experimental	12	1.99	.36	2.05	.28
	Control	12	1.98	.42	1.84	.31
Overall	Experimental	24	2.18	.48	2.08	.36
	Control	24	2.22	.48	2.13	.43

In this study, we used a mixed design of three factors, A*B*C. Factor A had two values: pre- and post-tests.

Factor B had two values: with and without online rational emotive curriculum (experimental group and control group). Factor C had two values: strong and weak hostilie tendencies. Three-factor ANOVA (mixed-design analysis of variance) analysis helped us to comprehend the effects of an online rational emotive curriculum on overall aggressive tendencies. From the ANOVA analysis, we see that the main effects of factors A and C were significant, whereas the main effect of factor B was not. The three-way interaction of A*B*C reached a significant level.

Table 4 shows that the three-way interaction of A*B*C with $F=5.05$, $p<0.05$ was significant. The two-way interactions were analyzed and are summarized in Table 5.

Table 4 Three Way Interaction of A*B*C

	SS	df	MS	F
A	.23	1	.23	4.65*
B	.04	1	.04	.14
C	3.34	1	3.34	.28**
A*B	.00	1	.00	.00
B*C	.53	1	.53	2.01
A*C	.08	1	.08	1.53
A*B*C	.25	1	.25	5.05*
Error from within	2.18	44	.05	
Error from between	11.48	44	.26	

*p<.05 **p<.01

In Table 5, we can see that the interaction of A*C in the experimental group was significant, with $F=5.22$, $p<0.05$, suggesting that the aggression scale scores of the experimental groups were affected by pre- and post-test, and by strong and weak hostile tendencies. The interaction of B*C of the post-test with $F=6.29$, $p<0.05$ was significant, indicating a significant difference between the scores of students from the two groups with strong and weak hostile tendencies in the post-test. Next, we compare the testing of the simple main effects in the two groups.

Table 5 Simple Interaction Effect of Three Way ANOVA Analysis

	SS	df	MS	F
A*B				
Strong hostile tendencies	.00	1	.00	.00
Weak hostile tendencies	.12	1	.12	2.18
A*C				
Experimental	.30	1	.30	5.22*
Control	.03	1	.03	.61
B*C				
Pre-test	.03	1	.03	.13
Post-test	.75	1	.75	6.29*

*p<.05

*The Interaction between A*C*

Table 6 presents analysis of the main effects of pre- and post-tests and strong and weak hostile tendencies for the experimental groups. Results indicate that the aggression scores of the students with strong hostile tendencies were significantly different in pre- and post-test, with $F=8.56$, $p<0.01$. The average scores for the group with strong hostile tendencies were 2.38 in the pre-test and 2.17 in the post-test. The latter was significantly lower than the former, suggesting that the aggression scores of the students in the group with strong hostile tendencies were significantly lower following administration of the online rational emotive curriculum. Unlike the group with strong hostile tendencies, there was no significant change between the pre- and the post-test for the group with weak hostile tendencies. We conclude that the online rational emotive curriculum had an inverse effect on the aggression scores among students with strong hostile tendencies. After learning to resist their irrational emotional responses, the students with strong hostile tendencies were able to respond to hostility provoking events in a more rational manner.

Table 6 Simple Main Effect of A and C

	SS	df	MS	F
A				
Strong hostile tendencies	.40	1	.40	8.56**
Weak hostile tendencies	.02	1	.02	.30
C				
Pre-Test	.88	1	.88	4.40*
Post-Test	.03	1	.03	.20

*p<.05

Table 6 also shows a significant difference between the experimental groups with strong and weak hostile tendencies in the pre-test the aggression scores ($F=4.40$, $p<0.05$) (factor C). The average aggression score for the group with strong hostile tendencies was 2.38, whereas the average score for the group with weak hostile tendencies was 1.99. It is clear that in the pre-test, the aggression score for the group with strong hostile tendencies was much higher than that for the group with weak hostile tendencies. However, in the post-test, the aggression scores did not show a difference between the two groups. The difference in the scores between the groups with strong and weak hostile tendencies in the pre-test was greater than the difference in the post-test. The scores in the post-test showed little difference between the two groups. This suggests that the online rational emotive curriculum helped to diminish the effects of hostile tendencies on aggression.

*Interaction between B*C*

Table 7 shows the main differences between the experimental and control groups in the post-test for those with strong and weak hostile tendencies. Results show a significant difference in the aggression scores for the control groups with strong and weak hostile tendencies in the post-test, with $F=18.44$, $p<0.001$; however, the aggression scores showed little difference between the experimental groups with strong and weak hostile tendencies in the post-test, with $F=.02$, $p<0.05$. After the regular course, the students in the control groups with strong hostile tendencies still had significantly higher aggression scores than those in the control groups with weak hostile tendencies. The effect of hostile tendencies on aggression scores was greater in the control groups. Conversely, after administration of the online rational emotive curriculum, the aggression scores were similar for all students in the experimental groups whether they had strong or weak hostile tendencies.

Table 7 Simple Main Effect of B and C

	SS	df	MS	F
B				
Strong hostile tendencies	.51	1	.51	3.40
Weak hostile tendencies	.26	1	.26	2.95
C				
Experimental	.03	1	.03	.20
Control	1.93	1	1.93	18.44***

***p<.001

The main effect of factor A shows that the aggression scores for both groups were lower in the post-test than in the pre-test. Analysis of B*C interaction showed that in the post-test the aggression scores of the control groups were largely influenced by hostile tendencies. This suggests that although the online information literacy course without REBT for the control groups was able to lower the average aggression scores in the post-test, the aggression scores for students with strong hostile tendencies were still much higher than those for students with weak hostile tendencies. Therefore, we determined that the online information literacy course without REBT had less of an effect on hostile tendencies. Conversely, the aggression scores for the experimental groups, who had received the online rational emotive curriculum, were significantly lower in the post-test than in the pre-test. The online rational emotive curriculum reduced the aggression scores of students with strong hostile tendencies to a level similar to those of students with weak hostile tendencies. Prior to the course, the aggression scores of students with strong hostile tendencies in both groups were at the same level, and the scores of both groups were reduced after the course. The aggression scores for the students in the experimental groups with strong hostile tendencies decreased more than those for the students in the control groups. However, for the students with weak hostile tendencies, the aggression scores of the control groups decreased more than those of the experimental groups. This indicates that the online rational emotive curriculum had a more pronounced effect on the students with strong hostile tendencies in reducing their aggressive tendencies. For the students with weak hostile tendencies, the general course showed a more significant influence on decreasing aggression scores.

Factor A showed a significant difference in aggression scores between the pre- and post-tests. Regardless of whether they were in the experimental groups or the control groups, or among students with strong or weak hostile tendencies, the aggression scores in the pre-test were always higher than those in the post-test. Factor C shows that the average aggression scores of the students with strong hostile tendencies were significantly higher than those of students with weak hostile tendencies. Regardless of whether they were in the experimental groups or control groups, or in the pre-test or in the post-test, the average aggression scores of students with strong hostile tendencies were always higher than those of students weak hostile tendencies.

DISCUSSION

By analyzing the scale measurements of elementary school students before and after the online information literacy course in this study, we found that real-world aggression and online aggression were moderately correlated. Even after subtracting the third variable—the effect of hostile tendencies—these two were still moderately correlated. In other words, students with a strong tendency to exhibit aggression in real life are likely to display aggressive behavior on the internet. Conversely, students who were aggressive toward others online were also likely to display aggressive behavior in real life. Currently, most information literacy courses in elementary schools have focused on the skills used to operate computers, and usually ignore the fact that incidents of hostility take place more frequently on the internet. Students who develop computer skills also acquire aggressive internet behavior, causing online aggression to spread. Integrating an online rational emotive curriculum into an information literacy course enables students to learn how to respond to incidents of hostility rather than randomly spreading the hostility. By doing so, the tendency of students to display aggression is reduced both online and in real life.

Through analysis using three-way ANOVA we observed interactions among the three factors associated with pre- and post-tests as variables—before and after the online information literacy course, with and without the online rational emotive curriculum, for groups with strong and weak hostile tendencies. In the pre-test aggression scores, the difference between students with strong and weak hostile tendencies in both the experimental groups and the control groups was greater than that in the post-test. However, the difference in scores for the post-test between the students with strong and weak hostile tendencies in the experimental groups was insignificant. This suggests that the online rational emotive curriculum decreased the aggression scores of the students with strong hostile tendencies in the experimental groups more effectively than courses without this supplementary training. Resisting the irrational emotional responses enabled the students with strong hostile tendencies to respond to hostile incidents in a rational manner. The online rational emotive curriculum is able to reduce the effects of hostile tendencies on aggression. These results are in agreement with the affective aggression theory proposed by Geen (1998), which holds that hostile incidents, previous experience, physiological factors, and social learning can influence aggressive tendencies (hostile tendencies). This study uses the power of education through an online rational emotive curriculum, to redirect the aggressive behavior of students toward more positive responses, thereby reducing the occurrence of aggressive behavior.

Although the online information literacy course without REBT (control group) was also able to lower the average aggression scores in the post-test, the aggression scores of students with strong hostile tendencies were still much higher than those of students with weak hostile tendencies. The course without REBT had a far less obvious effect on hostile tendencies. On the contrary, the post-test aggression scores of the experimental group were significantly lower than those of the pre-test. The online rational emotive curriculum not only decreased the aggression scores of students with strong hostile tendencies, but also dropped the scores to levels comparable to those of students with weak hostile tendencies.

We determined that the online rational emotive curriculum and hostile tendencies mutually influence aggression scores. The decrease was greater for students with strong hostile tendencies in the experimental group. However, for students with weak hostile tendencies, the control groups showed a greater decrease in the aggression score. This suggests that the online rational emotive curriculum had a significant effect on students with strong hostile tendencies, effectively reducing their aggression. For students with weak hostile tendencies, taking the general course lowered the aggression scores through a wider range.

It should be noted that before children establish rational concepts, they may have difficulty in understanding hostile incidents. To handle hostility, they usually respond with an intuitive emotional reaction. Therefore it is important to educate them and make them aware that everyone has their own emotions; that it is normal to have negative emotions when confronted by an incident of hostility and the key is learning how to deal with them. Through the integration of the rational emotive curriculum into the online information course, these young students gained experience in rationally dealing with incidents of hostility, empowering them to make correct judgments. By learning to resist their irrational emotions, they can work out better solutions.

CONCLUSION

This study investigated the linkage between online and real-world aggressive behavior, among primary school students in four intact classes. We investigated the effects of an online rational emotive curriculum integrated within an information literacy course to reduce the tendency of students to display aggression online and in the real-world. The results show a moderate correlation between online and real-world aggressive behavior among primary school students. In addition, we demonstrated that the online rational emotive curriculum had a significant effect on students with a strong tendency for hostile behavior, and helped to alleviate this problem.

In the future, comparative studies with and without an online rational emotive curriculum need to be conducted with students from different grades and levels using various online platforms. This would enable more students to rationally deal with hostile incidents on the internet, thereby preventing them from spreading hostile and aggressive behavior. This, in turn, will help them to reduce hostile and aggressive behavior in their everyday lives.

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REFERENCES

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.

Berkowitz, L. (1993). *Aggression: Its causes, consequences, and control.* NY: McGraw-Hill.

Berkowitz, L. (1998). Affective aggression: The role of stress, pain, and negative affect. In Geen, R. & Donnerstein, E. (Eds.), *Human aggression: Theories, research, and implications for social policy* (49–71). San Diego, Calif.: Academic Press.

Chang, C. S., Liu, E. Z. F., Lee, C. Y., Chen, N. S., Hu, D. C., & Lin, C. H. (2011). Developing and validating a media literacy self-evaluation scale (MLSS) for elementary school students. *Turkish Online Journal of Educational Technology, 10*(2), 63-71.

Chen, Y. L., Liu, E. Z. F., Shih, R. C., Wu, C. T., & Yuan, S. M. (2011). Use of peer feedback to enhance elementary students' writing through blogging. *British Journal of Educational Technology, 42*(1), E1-E4.

Chiang, Y. T., Lin, S. S. J., Cheng, C. Y., & Liu, E. Z. F. (2011). Exploring online game players' flow experiences and positive affect. *Turkish Online Journal of Educational Technology, 10*(1), 106-114.

Derlega, V. J., & Janda, L, H. (1986). *Personal adjustment: The psychology of everyday life*. NY: Scott Foresman & Co.

Derks, D., Bos, A. E. R., & Grumbkow, J. V. (2007). Emoticons and social interaction on the internet: The importance of social context. *Computers in Human Behavior, 23*(1), 842–849.

Ellis, A. (2000). Rational emotive behavior therapy. In R. V. Corsini & D. Wedding (Eds.), *Current psychotherapies* (pp. 168–204). Itasca, IL: Peacock.

Ellis, A. (2001). *Overcoming destructive beliefs, feeling and behaviors*. Amherst, NY: Prometheus Books.

Ellis, A., & MacLaren, C. (2005). *Rational emotive behavior therapy: A therapist's guide*. Atascadero: Impact Publishers.

Geen, R.G. (1998). Processes and personal variables in affective aggression. In Geen, R. & Donnerstein, E. (Eds.), *Human aggression : Theories, research, and implications for social policy* (1–20). San Diego, Calif.: Academic Press.

Gonzalez, J. E., Nelson, J. R., Gutkin, T. B., Saunders A., Galloway, A., & Shwery, C. S. (2004). Rational emotive therapy with children and adolescents: A meta-analysis. *Journal of Emotional and Behavior Disorders, 12*(4), 222–235.

Hou, H. T. (2010). Exploring the behavioral patterns in project-based learning with online discussion: Quantitative content analysis and progressive sequential analysis. *Turkish Online Journal of Educational Technology, 9*(3), 52–60.

Huesmann, L. R. (2007). The impact of electronic media violence: Scientific theory and research. *Journal of Adolescent Health, 41*(6), 6–13.

Ko, C. H., Yen, J. Y., Liu, S. C., Huang, C. F., & Yen, C. F. (2009). The associations between aggressive behaviors and internet addiction and online activities in adolescents. *Journal of Adolescent Health, 44*(6), 598–605.

Leahy, R. L. (2001). *Overcoming resistance in cognitive therapy*. NY: Guilford.

Li, Q. (2007). New bottle but old wine: A research of cyberbullying in schools. *Computers in Human Behavior, 23*(4), 1777–1791.

Lin, S. S. J., & Hwang, H. Y. (2005). *The construction of a compositive model of pathological internet use and internet hostility by structural equation modeling technique.* Annual meeting of 2005 American Psychological Association, Washington, DC, USA.

Liu, E. Z. F., & Chang, Y. F. (2010). Gender differences in usage, satisfaction, self-efficacy, and performance of blogging. *British Journal of Educational Technology, 41*(3), E39-E43.
Liu, E. Z. F., Lin, C. H., & Chang, C. S. (2010). Student satisfaction and self-efficacy in a cooperative robotics course. *Social Behavior and Personality, 38*(8), 1135-1146.
Liu, E. Z. F., & Lin, S. S. J. (2007). Relationship between peer feedback, cognitive and meta-cognitive strategies and achievement in networked peer assessment. *British Journal of Educational Technology, 38*(6), 1122-1125.
Ramírez, & Andreu (2006). Aggression, and some related psychological constructs (anger, hostility, and impulsivity): Some comments from a research project, *Neuroscience & Biobehavioral Reviews, 30*(3), 276–291.
So, H. J. (2010). Towards rigor of online interaction research: Implication for future distance learning research. *The Turkish Online Journal of Educational Technology, 9*(2), 256–263.
Thompsen, P. A. (1993). *A social influence model of flaming in computer-mediated communication*. Annual Meeting of the Western States Communication Association, Albuquerque, NM. (ERIC No. ED 355572).
Thompsen, P. A., & Foulger, D. A. (1996). Effects of pictographs and quoting on flaming in electronic mail. *Computers in Human Behavior, 12*(2), 225–243.
Wang, H., & Hong, Y. (1995). *Flaming: More than a necessary evil for academic mailing lists*. (ERIC No. ED 385261).
Yagci, E., & Caglar, M. (2010). How the use of computer types and frequency affects adolescences towards anger and aggression. *Turkish Online Journal of Educational Technology, 9*(1), 89–97.

EFFECTS OF LINEAR TEXTS IN PAGE SCROLLING AND PAGE-BY-PAGE READING FORMS ON READING COMPREHENSION INTRODUCTION

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ABSTRACT
This research aims to analyse the Effect of Scrolling and page by page moving Static Texts on Comprehension of Screen Reading of 4th grade students. The sample was composed of 46 students of 4th grade students of a elementary school in Kırşehir Central Province. The classrooms of the participants were selected by random sampling method and compared in the quasi experimental design. The students were assigned to experiment and control group according to the result of drawing. The achievement test for reading comprehension has been applied as a baseline test in order to understand the readiness level of the two groups. Then, 6 texts, compliant with the level of the students, (two narrative and two informative texts and a poem) were read by the students. The students in the experiment group read the text with scrolling method and the students in the control group read the text with page by page moving method. As a post test, reading comprehension test, which composed of 30 questions, has been applied to students of both groups. Results showed that there is no significant difference between the comprehension scores of students who followed the page scrolling method and those who followed page-by-page reading method.
Key Words: Linear texts**,** page scrolling, page by page moving, screen reading, comprehension.

INTRODUCTION
With the technology making its mark on all areas of the age we are living in, it is now a necessity to utilize technology in the field of education, as well. The technological advancements have affected the reading habits, mostly in a negative way. Differently from the traditional ways, today's youth tend to perform reading on computers, which is a cheaper and easier sources of information. Screen reading has become very common due to the rapidly developing information technologies of today. Because texts are more and more transferred into computerized pages and published by means of computers. In order to reach new information, readers have to read on the screen. By this way, a new way of reading known as "screen reading" and a new kind of reader called "screen reader" have appeared. This way of reading, which became widespread in all areas, has distinctions from the conventional way of reading from paper (Güneş, 2009). It is now possible to learn through screen reading and to design and develop the customizable reading media that distinguish the individuals and differentiates according to their differences (Brusilovsky, 2003).

The fact that the amount of information to be learned increases incrementally and the learning needs to be continuously updated because of information losing their currency in time necessitate a change in learning and learning environments (Khan, 1997; Alotaiby, 2005). This requires the implementation of a number of changes pertaining to modernization of learning programs. It is known that the effectively used instructional technologies increase the effectiveness of the learning - teaching process. For this reason, the educational development objectives of many countries in the recent years also cover the integration of computer technologies with instructional programs (Korkut & Akkoyunlu, 2008).

In this context, also the Ministry of National Education (MNE) of Turkey establishes Information Technology Courses in all schools and stipulates students to learn to use computers and more importantly raises generations that reach information through internet access. The skills for "using information technologies" have been included among the basic skills to be taught to students in the primary school programs modified in 2005 (MNE, 2005).

Besides modifying the programs, MNE also restructures learning environments in order to raise individuals capable of utilizing the technology. With the Increasing Opportunities and Improvement of Technology Project of 2010, which has been planned in line with the objective related to the utilization of information technologies in our education system stated in the (2006-2010) Information Community Strategy prepared by State Planning Organization as "Information and communication technologies will be among the fundamental tools of the educational process and the active utilization of these technologies by the students and teachers will be ensured.", the Ministry has initiated efforts for equipping 620.000 classrooms of all pre-school, primary and secondary schools with laptop computers, projection tools and internet infrastructure in order to ensure the effective utilization of IT tools during the courses, for the purpose of providing equal opportunities and improving the technologies of our schools. (URL-1, 2011). For this reason, it is believed that electronic texts will be more frequently utilized in educational environments in the forthcoming years.

Since the functionality of the reading process is directly related with the design of these environments (Altun, 2000), it is important to know how to present the reading tezt to students in what sort of a learning environment. With this purpose in mind, the effect of linear texts prepared in page scrolling and page-by-page reading forms used in Turkish courses, on the reading comprehension skills of the fourth grade students has been examined. The pages where information are provided in a computerized environment can be designed in two separate forms as the long pages where the information is viewed by moving the page up and down by using a ***page scroll*** bar or the page***-by-page*** designs where information is divided into small pages that can be viewed one by one by using the next page or previous page buttons.

Linear text or linear hypertext are designs of hypertext that allow transitions from the current screen only to the next or previous screen are possible and where a linear movement is allowed between the screens through the links given (Çakmak & Altun, 2008). When working with linear texts, the reader or the learner has to follow the path provided by the designer in order to access the information necessary for learning. Information beyond the linear path cannot be accessed from the current point. Both in printed materials and conventional computer aided educational materials progress is made in a linear way. Linear order is considered to be more convenient for presenting details and cause and effect relations (Ayersman, 1996: 505 quoting from Gordon, Lewis, 1992). Emphasizing that linear texts are one of the fundamental structures of hypertexts, Karadeniz, Karataş and Kılıç (2004) states that "(a structure where) the reader or student reads the information in order and passes to another one after finishing one is a linear structure".

During the preparation of this paper, many studies on the text-reading for students and environment for text-reading have been found in the literature (Eyüboğlu, 2007; Dunser & Jirasko 2005; Karadeniz 2004; Kılıç & Karadeniz, 2004; Calcarterra, Antonietti, Underwood, 2004; Schwartz, Andersen, Howard, Hong & McGee 2004; Lee & Tedder, 2003, Graff, 2003; Kim 2001; Ford & Chen, 2000; Leader & Klein 1994). Yet, these studies were generally conducted with high-school and university students. Very few studies conducted with primary school students have been found (Çakmak & Altun, 2008; Riding & Grimley, 1999; Reinking, 1988). Similarly, according to Eyüboğlu and Orhan (2009), although there are many studies on the design properties of hypertexts (such as the page arrangement of the menus, different types of menus and links, and browsing tools) the page lengths of hypermedia or hypertexts have not been studied with sufficient depth. With the purpose of filling this gap in the literature, this study has been conducted in order to set forth the effects of scrolled and page-by-page displayed texts on the reading comprehension of the students attending to the 4th grade of primary school. Within the frame of this general objective, the answers of the below given questions have been sought:

1. Is there a significant difference between the reading comprehension pre test success rates of the students in the experimental and control groups?
2. Is there a significant difference between the reading comprehension pre test success rates among the students of the experimental group?
3. Is there a significant difference between the reading comprehension pre test success rates among the students of the control group?
4. Is there a significant difference between the reading comprehension post test success rates of the students of the experimental and control groups?

METHOD

The study is an empirical study based on pretest-post test model with control group.

Study Group

The research has been conducted with a total of 44 participants who were randomly selected from two different fourth grade classrooms in a primary school located in Kirsehir city center, during the Spring of 2010-2011 academic year. The students which were available in school on the days when preliminary and final tests were conducted have been included in the study. After drawing one group asthe control group where the texts are presented in a page scrolling format, the other has been determined as the experimental group where reading texts have been submitted in a page-by-page format. Experimental group consisted of 19 students. 31,6 % of these were females while 68,4 % were male students. The control group consisted of a total of 25 students, of which 44 % are females and 56 % are males.

Preparation of the Texts
The texts have been compiled from the textbook by Koza Publications, which was distributed by the Board of Education and Discipline to primary school 4th grade students as textbook in the previous years. This textbook was not being used when this study was being held because of the expiry of its recommended term. This book has been purposefully selected to make sure that the students did not read it before. The 2005 Turkish Curriculum for Primary Schools stipulates that three kinds of texts are to be included in the textbooks. These are narrative texts, informative texts and poems. It has been paid attention for the texts to be given to the students in this study to include all of these three kinds of texts and two texts for each type have been selected. The titles of the selected texts are given below:

Narrative texts;"Seeing Bird Chirps and Bakery Smell" and "The Flute that Lost its Sound".
Informative texts; "How to Cope With Your Phobias" and "The Hand".
*Poems; "*Farmers" and "The Requiem of the Olive Tree".

When the selected texts have been arranged to fit both page scrolling and page-by-page reading techniques by the researcher, also visuals that will aid and ease the comprehension of the context of the texts have been added and computerized.

Procedures
The administration of thereading the texts from screen have been carried out in the information technology classroom of the school of the participants. Before starting the administration, the computers in the classroom have been checked if they are in working condition. 13 computers have been determined to be properly working and the text files to be read have been saved on the desktops of these computers. The administration and data collection have lasted for a total of 6 weeks. Each week, on the hours when the students attend to their Information and Technology course, the students of both control and experimental group have been separately asked to perform screen reading by the researcher for 2 hours. Due to the fact that the number of the students in both groups exceeds the number of available computers, the students have been divided into two groups and they have been allowed to the classroom separately to read the same texts. When a group has entered into the information technology class to read the selected texts, the other group has continued their courses in their own classes with their class teachers. Before starting the implementation, it has been checked whether the students know about the basic computer commands. Since the students have attended computer course through their fourth grade, it has been observed that they all have the basic computer using skills.

Each week one of the texts prepared with page-by-page reading form have been read from the screen by the students of the experimental group. Each time, the texts have been read aloud by the researcher one time before the students. After the exemplary reading, the students have been asked to silent read the texts a couple of times. Then, the texts have been read aloud by the students. In the meantime, the other students have been instructed to listen to and follow the text being read. After it has been ensured that the text has been comprehended by the students, they have been asked to take a multiple choice text concerning the read text.

The same process has been implemented with the students of the control group in their own Information Technology courses for the same 6 texts arranged in page scrolling format.

Instruments
Pretest: After the students had been divided into experimental and control groups, a reading comprehension test consisting 30 questions has been administered as as the *pretest*. In order to prepare the reading comprehension test, the 39 acquisition goals concerning reading comprehension for the fourth graders as per the Primary School Turkish Curriculum has been determined (MNE, 2005: 92-94). It has been ensured that the questions included in the reading comprehension test meet these attainments. At first 50 questions have been prepared. The words, sentences and paragraph lengths have been paid attention to in order to balance the difficulty levels of the texts included in the test. Two Turkish teachers and two class teachers have been consulted in order to ensure that the questions are understandable and suitable for the skill levels of the students. After being rearranged as per the experts' opinions, 40 questions have been submitted to 120 students attending to the fourth grade of a primary school in the city center of Kirsehir. Item discriminationand item difficulty indices have been determined for each item as per the results of the application. By correcting the questions with low item difficulty and discrimination indexes, the measuring tool has been given its final form with the number of questions reduced to 30.

To test the internal consistency, we checked KR-20. It has been calculated as .83. The 30 questions about comprehension have been applied to the students in experimental and control group at the same date for an hour for each group and in the form of reading from paper.

Post-test: The measuring tool implemented as the post test has been formed out of 5 questions at information level for each text read. The initial scale consisted of 48 questions (8 questions for each text) and then had been evaluated by 4 experts (2 Turkish teachers and 2 classroom teachers) in order to test its validity. In accordance with the feedbacks received, some of the items have been removed from the test and some others have been rearranged. 130 students attending to the 4th grade of a primary school in Kirsehir has been subjected to the new form of the test that covers 40 questions. In conclusion of the analysis conducted in order to determine reliability, items that have lower reliabilities have been removed from the test. However, with the purpose of the test covering all six texts equally, the distracters of some questions have been rearranged and kept in the test. The KR-20 reliability coefficient of the test prepared in this way with 30 questions, as 5 questions for each text, has been calculated to be .81. Şencan (2005) emphasizes that, in case the KR-20 formula is implemented for a test consisting low number of items, even a score as low as .50 can be sufficient for deeming the test reliable. According to this, it has been accepted that a .81 reliability coefficient found for a 30 question test indicates a good level of reliability in terms of the norm based test approach.

The students have been given one point for each question they have answered correctly during the tests. Wrong answers have been ignored. Therefore, the highest score the students can get from the pre and post tests can be 30.

Data Analysis

Average, percentage, frequency and standard deviation have been utilized in analyzing the data. For comparing experimental and control groups, T-Test for independent samples and for comparing the difference between pretest and posttest results of the students, T-Test for dependent samples have been conducted. Significance level for comparisons has been determined as .05.

FINDINGS

The findings related to the reading comprehension scores of the experimental and control group have been summarized in the following tables:

Table 1. *Independent sample T-Test Results of the Pre Test Scores of Experimental and Control Groups*

Groups	N	$\bar{X}$	S	Sd	t	p
Experimental	19	21,63	4,43	42	3,61	0,01
Control	25	25,76	3,14			

P< 0.05

According to the findings given in the table, there is a significant difference in favor of the control group between the points scored by the experimental group (X= 21,63) and control group (X= 25,76) from the preliminary test, conducted in order to determine the students' reading comprehension levels (t (42) = 3,61 and p<.05).

Table 2. *Dependent T-Test Results of the Preliminary Test - Final Test Scores of Experimental Group Students*

Measurement	N	$\bar{X}$	S	Sd	t	p
Pre Test	19	21,63	4,44	18	1,77	0,93
Post Test	19	20,32	4,30			

P>0.05

No significant difference has been found between the pre test scores of the experimental group students regarding paper-reading comprehension and the post test scores they have obtained in relation with the text they have read by means of page-by-page screen reading (P>0.05). While the preliminary test point average of the students has been calculated as X= 21,63, their post test point average has been determined to be X= 20,32.

Table 3. *Dependent T-Test Results of the Pre Test - Post Test Scores of Control Group Students*

Measurement	N	$\bar{X}$	S	Sd	t	p
Pre Test	25	25,76	3,14	24	4,23	0,00
Post Test	25	22,84	2,85			

P<0.05

There is a significant difference between the paper reading comprehension preliminary test points and the page scroll reading comprehension post test points of the students of the control group (t (24) = 4,23 and P>0.05). While their pre test point averages of the students had been X= 25,76, their post test point averages has declined to X= 22,88.

Table 4. *Independent T-Test Results of the Post Test Scores of Experimental and Control Group Students*

Groups	N	$\bar{X}$	S	Sd	t	p
Experimental	19	20,32	4,30	42	2,34	0,24
Control	25	22,84	2,85			

P>0.05

Independent T-Test results for the post test point averages of the students of experimental and control groups are given in Table 4. According to the findings presented in the table, there is no significant difference between the post test point averages obtained by the students of the two groups (t (42) = 2,34 and p>.05). This indicates that 4th grade students comprehend the texts they read by page scrolling and page-by-page forms with similar levels. While the control group students have answered 22,84 of the 30 questions related with the text they have read by page scrolling correctly, the experimental group students have answered 20,32 of the questions related with the same texts they have read page-by-page.

CONCLUSIONS AND DISCUSSION

Although a significant difference has been found in the study for the students of the control group between the paper reading comprehension pre test results and the page scrolling reading comprehension post test results, no such significant difference could be found for the students of the experimental group between the points they have scored from the tests examining their comprehensions from paper reading and the page-by-page screen reading. However, it can be stated that this results from the fact that a significant difference in favor of the control group has been found between the pre test results of the experimental group students and the pre test points of the control group students. Since the students have been randomly assigned to experimental and control groups, it can be interpreted that the equalities have not been established before the experiement. Also, there are studies in the literature pointing out that reading from paper or from a screen does not have any advantages over each other. In this context, in the study conducted on 33 students from fifth and sixth grades Reiking (1988) has reached the conclusion that reading linearly presented texts from a computer screen does not bring any advantage over reading them from printed materials, in terms of aiding recollection.

In this study, the point whether the linear texts, which had been prepared for Turkish course, read through page scrolling and page-by-page screen reading did not have any significant effect on the reading comprehension skills of the 4th grade students, and it has been determined that there is no difference between the post test success rates of the control and experimental groups. This result indicates that students comprehend the texts they read by page scrolling or page-by-page display at similar levels. In the literature, it is possible to find many studies with conclusions either supporting or contradicting with the conclusions of this study. Eyüboğlu (2007), Bernard, Baker and Fernandez (2002) and Nielsen, 1997 have found that readers and students mostly prefer texts presented in long pages. In his research examining the effects of page scrolling and page-by-page reading on comprehension, Baker (2003) has once again found that page scrolling has a more positive contribution in the comprehension levels, compared to advancing through the pages with a forward button. On the other hand, Roussey and Thunin (1998) have determined that dividing information into separate pages and presenting it in a form that can be viewed page-by-page increase performance of the students (cited in Bernard, Baker & Fernandez, 2002).

In another study, it has been concluded that page-by-page reading is mostly preferred by inexperienced users, yet it does not create a significant difference in completing a given task or conducting a search within the text (Schwartz, Andersen, Howard, Hong, and McGee, 2004). In some other studies it has been concluded that neither of the techniques have any effect on user performance (Bernard, Baker, and Fernandez, 2002 quoting from Mills & Weldon, 1986). These findings support the findings of the present study.

SUGGESTIONS

By conducting researches similar to the present study, in which the comprehension levels of the 4th grade students from page scrolling and page-by-page reading have been examined, with different regions, different schools and for different grades and age groups, the matter how the page lengths and designs of the screen reading or learning materials are to be prepared for primary school students can be determined.

In this study, the students have been provided with linear hypertext samples of a single type and structure, where the students have to follow the path the designer provided and cannot jump to the information beyond the designed linear path. Accordingly, the determinations are limited for the texts of this type and structure. Therefore, the study can be repeated for hypertexts of different structures as hierarchical, nonlinear and mixed hypertexts.

REFERENCES

Alotaiby, F. T. (2005). A component based functional model for elearning systems**.** Ph.D Thesis, George Mason University.

Altun, A. (2000). Patterns in cognitive process and strategies in hypertext reading: A case study of two experienced computers users. *Journal of Educational Multimedia and Hypermedia*, 9(1);35-55.

Ayersman, D. J.(1996). Reviewing the research on hypermedia-based learning. *Journal of Research on Computing in Education.* 28 (4): 500-525.

Baker, J. R. (2003). The impact of paging vs scrolling on reading online text passages. *Usability News.* 5,1, psychology, wichita.edu/surl/usabilitynews/51/paging_scrolling.htm (26.05.2008)

Bernard, M., Baker. R. & Fernandez, M. (2002). Paging vs Scrolling: Looking for the best way to present search results. *Usability News* 4.1. psychology.wichita.edu/surl/usabilitynews/41/paging.htm (20.03.2010)

Brusilovsky, P. (2003) Adaptive navigation support in educational hypermedia: The role of student knowledge level and the case for meta-adaptation. *British Journal of Educational Technology***,** 34 (4), 487-497

Calcaterra, A. & Underwood, J. (2005). Cognitive style, hypermedia navigation and learning. *Computers & Education***.** 44 (4); 441- 457.

Çakmak, E. & Altun, A. (2008). İlköğretim öğrencilerinin hipermetinsel okuma süreçlerinin incelenmesi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 34, 63-74

Dünser, A. & Jirasko. M. (2005). ınteraction of hypertext forms and global versus sequential learning styles**.** *Journal of Educational Computing Research***.** 32(1); 79-91.

Eyüboğlu, F. (2007). Farklı bilişsel tarzlara sahip üniversite öğrencilerinin sayfa uzunluğu farklı hiperortamlarda erişileri, dolaşma araçlarını kullanma sıklıkları ve hiperortama ilişkin görüşleri. Yayınlanmamış doktora tezi. İstanbul: Yıldız Teknik Üniversitesi, Sosyal Bilimler Enstitüsü.

Eyüboğlu, F. & Orhan, F. (2009). Sayfa uzunluğu farklı hiperortamların öğrenme performansı ve memnuniyete etkisi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 36: 97-108.

Ford, N. & Chen, S. (2000). Individual differences, hypermedia navigation, and learning: an empirical study. *Journal of Educational Multimedia and Hypermedia***.** 9(4); 281-311.

Graff, M. (2003). Learning from web-based ınstructional systems and cognitive style. *British Journal of Educational Technology.* 34(4); 407-418.

Güneş, F. (2009). Ekran okumada verimlilik**.** *Kalkınmada Anahtar Verimlilik Gazetesi,* Milli Prodüktivite Merkezi Aylık Yayın Organı. 248, 26-28

Ford, N. & Chen, S. (2001). Matching/mismatching revisited: an empirical study of learning and teaching styles. *British Journal of Educational Technology***.** 52(1); 5-22.

Karadeniz, Ş. (2004). Bilissel esneklik, hiper metinler ve hiperortamlar. *The Turkish Online Journal of Educational Technology-TOJET***.** 3, 2-9.

Karadeniz, S., Karatas, S., ve Kılıç, E. (2004). Öğretim amaçlı internet ortamlarının tasarımı ve temel ilkeleri. *Milli Egitim Dergisi, 161,* 137–147.

Khan, B. H. (1997). Web Based Instruction**.** Englewood Cliffs, New Jersey: *Educational Technology Publications, Inc*

Kılıç, E.& Karadeniz, S.(2004). Cinsiyet ve öğrenme tarzının dolamsa stratejisi ve başarıya etkisi. *Gazi Egitim Fakültesi Dergisi***.** 24(3);129-146.

Kim, K. S. (2001). Implications of user characteristics ın ınformation seeking on the world wide web. *International Journal of Human-Computer Ineraction*. 13(3); 323-340.

Korkut E., & Akkoyunlu, B. (2008). Yabancı dil öğretmen adaylarının bilgi ve bilgisayar okuryazarlık öz-yeterlikleri . *H. Ü. Eğitim Fakültesi Dergisi* . 34, 178-188

Millî Eğitim Bakanlığı. (2005). İlköğretim Türkçe Dersi Programı (1-5. Sınıflar). Ankara: Devlet Kitapları Müdürlüğü Basımevi.

Leader, L. F. & Klein, J. D. (1994). The effects of search tool and cognitive style on performance ın hypermedia database searches. *National Convention of the Association for Educational Communications and Technology Kongresi*, 16- 20.02.1994.
Lee, M. J. ve Tedder, C. M. (2003) .The effect of three different computer texts on readers' recall: based on working memory capacity. *Computers in Human Behavior*. *19*, 767-783.
Nielsen, J. (1997). Changes ın web usability Since 1994. www.useit.com/alertbox/9712a.html (18.08.2008).
Reinking, D. (1988). Computer- mediated text and comprehension differences: The role of reading time, reader preference, and estimation of learning. *Reading Research Quartery*. *23*, 485-489.
Riding, R. & Grimley, M. (1999). Cognitive style, gender and learning from multimedia materials ın 11-year-old children. *British Journal of Educational Technology*. 30(1); 43-56.
Schwartz, N. H., Andersen,C., Howard, B., Hong, N. & McGee, S. (2004). The ınfluence of metacognitive skills on learners' memory of ınformation ın a hypermedia environment. *Journal of Educational Computing Research*.. 31(1); 77-93
Şencan, H. (2005). Sosyal ve davranışsal ölçümlerde güvenilirlik ve geçerlilik. Ankara: Seçkin Yayıncılık.
URL-1: http://fatihprojesi.meb.gov.tr/site/amac.php (20. 03. 2011)

EFFECTS OF REFLECTION CATEGORY AND REFLECTION QUALITY ON LEARNING OUTCOMES DURING WEB-BASED PORTFOLIO ASSESSMENT PROCESS: A CASE STUDY OF HIGH SCHOOL STUDENTS IN COMPUTER APPLICATION COURSE

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ABSTRACT
This study examines the effects of reflection category and reflection quality on learning outcomes during Web-based portfolio assessment process. Experimental subjects consist of forty-five eight-grade students in a "Computer Application" course. Through the Web-based portfolio assessment system, these students write reflection, and join self-assessment and peer-assessment. The Phrase Processing System is used to distinguish phrases in students' reflections, and finally students' reflections are classified. Results from this research indicate that the effect size of reflection category on learning outcomes measured by achievement test, work, and attitude is extremely small and not significant. The effect size of reflection quality on learning outcomes was small, but significantly positive. Follow-up contrasts found reflection quality significantly related to achievement test, work, and attitude outcomes.
Keywords: Portfolio, Portfolio Assessment, Reflection, Learning outcome

INTRODUCTION
Portfolio Assessment is a formative process based on the content of an individual student's portfolio. It aims to review the achievement and capability which students have obtained from their learning. Moreover, it assists students in solving the difficulties they encounter during the learning process. What students are creating a portfolio for is to have a sense of accomplishment, which may induce learners to have a feeling of honor, responsibility and contribution (Paris and Ayres, 1994). An e-portfolio served as a record keeping tool has been widely used to help preservice teachers develop their reflective skills (Herner-Patnode & Lee, 2009; Yao, Aldrich, Foster, & Pecina, 2009). Grant, Vermunt, Kinnersley, and Houston (2007) used portfolio assessment in reflection activities of medical college freshmen. Eppink (2002) proposed that portfolio assessment might enhance a student's self-reflection and promote the development of meta-cognition. Rees, Shepherd, and Chamberlain (2005) used a reflective portfolio for assessing a medical college student's professional development and encouraging his/her reflective thinking. Therefore, portfolio assessment helps develop a student's reflective thinking skill and diversified intellectual activities, and provides students with more effective and practical evaluation.

In recent years, portfolios and reflection journals concerning the development of a learner's reflection capability have received increasing attention. Chang (2008) argued in his study that the implication of portfolio assessment should involve a learner's reflection, with an intention to allow the learner to review his/her own learning process. He further argued that portfolio assessment also allowed the learner to identify a learning method that best fit his/her learning by reflecting his/her failure experience and thereby promote his/her lifelong learning capability. Lazear (1999) suggested that reflection was the core for a learner in the learning process. For this reason, reflection is an indispensable element of a portfolio (Barrett & Garrett, 2009; Barrett, 2010). The difference between a portfolio and a folder lies in the learner's reflection; without a learner's reflection, a portfolio is nothing but another type of folder. According to Barrett (2004), an e-portfolio without reflection is just a media document file, a magic electronic resume, or a digitalized clipboard. Therefore, we can create a reflection-focused portfolio by adding appropriate reflection and feedback, such as learning journal, self-assessment, peer-assessment and feedback, into Web-based portfolio assessment.

Reflection can be categorized into reviewing process, contemplative process, comparing process and judging process (Santos, 1997). By degree, the quality of reflection can be evaluated and classified into "unmatchable," "basic," "good" and "outstanding" (Morgan, 1999). A study of Chen, Kinshuk, Wei, and Liu (2010) evaluated reflection quality based on the five levels which are reporting, responding, relating, reasoning, and reconstructing. Additionally, it can also be divided into "purpose," "supportability," "systematization," "syntax" and "writing skill" (King-Shaver, 1999). Learners will show different reflection qualities in accordance with different levels and types. However, what are the levels or categories of reflection occurring to learners during the process of Web-based portfolio assessment? How will reflection be categorized? How is the reflection quality during Web-Based portfolio assessment process? How can it be measured? These are issues worthy of study and concern.

In terms of learning outcome promoted by reflection, it, for instance, can boost a medical college junior's performance on the skill test of clinical diagnosis (Blatt, Plack, Maring, Mintz, & Slmmens, 2007). Besides, reflection may also increase a business school freshman's self-regulated learning ability and academic performance (Masui & De Corte, 2005). Writing a reflective journal may develop higher scientific literacy of pre-service teachers (Gibson, Bernhard, Kropf, Ramirez, & Van Strat, 2001). Reflection may facilitate a student's review and correction of his initial ideas and therefore leads to more acceptable work (Davis, 2000). In promotion of attitude and meta-cognition, students who gradually understand their learning role during the course of reflection can have an insight into their thinking process and their characteristics, attitude, attention, dominance, persistence, and other fundamental responsibilities (L. Campbell, B. Campbell, and Dickinson, 2002). King-Shaver (1999) suggested that the most significant benefit of reflection was to allow learners to understand their merits and limitations on learning and ultimately take responsible for their learning behavior.

Most of the studies on the effect of reflection as discussed above involve the comparison between learners with reflection and without reflection and have nothing to do with the effect of reflection category and quality on learning outcome. Most reflections are observed in the classroom, without involving the use of a portfolio, not to mention the use of Web-based portfolio assessment. If we classify reflection into some levels and then use statistics to compare the difference in learning outcome between learners with different categories of reflection, we may judge whether the categories of reflection have any effect on learning outcome. Alternatively, if we assess and classify reflection and then use statistics to compare the difference in learning outcome between learners with different reflection qualities, we may judge whether different reflection qualities have any effect on learning outcome. However, during the course of Web-based portfolio assessment, is there any difference in learning outcome between learners with different reflection qualities? Does a learner with better reflection quality also have better learning outcome? Is there any difference in learning outcome between learners with different categories of reflection during Web-based portfolio assessment process? These issues are the ones the study intends to explore.

Based on the foregoing context, this study is designed to examine the effect of learners' reflection behavior (category and quality) on learning outcome during Web-based portfolio assessment process. The research questions are as follows:

1. Are there significant differences in the learning outcome (measure by the scores on achievement tests, the rubric score of work submissions, and the score on an attitude survey), based on the categories (emotion, memory, cognition, and evaluation lexicons) of self-reflections in a web-based portfolio assessment?
2. Are there significant differences in the learning outcome, based on the qualities (high, middle, and low) of self-reflections in a web-based portfolio assessment?

LITERATURE REVIEW

Web-Based portfolio assessment and Online Reflection

A Web-based portfolio assessment system developed by Chang (2008) includes goal setting, reflection writing, work uploading and demonstration, self-assessment, peer-assessment, and teacher assessment and feedback, etc. Wielenga, Ritzen, and Kosters (1999) developed a Web-based portfolio assessment system for an experiment with pre-service teachers. The system has functions like personal profile: where the learner's experience and background can be edited, modified and browsed; Work storage: the learner's work can be saved; Self-assessment: the learner can assess or defend his/her learning achievement here; Work demonstration: the learner's work and reflection can be demonstrated; Portfolio browsing: the learner's portfolio can be browsed; Online records: the learner's learning situation and process in the system can be recorded.

From the forgoing discussion, it is found that the Web-based portfolio assessment system must include learners' reflection on learning, peer discussion, peer-assessment and feedback, self-assessment, and dialogs between teachers and students to encourage reflection of students (Eppink, 2002), so as to match the implication of Web-based portfolio assessment. The interaction between teachers and students or between peers and feedback may serve as reference for self-reflection and correction for achieving the learning goals. Online reflection is crucial for Web-based portfolio assessment; it can (1)increase reflection ability (Avrramidou & Zembal-Saul, 2002; Coombe & Barlow, 2004; Morris & Buckland, 2000); (2)increase a learner's critical thinking ability;

(3)facilitate writing, storage, modification, browsing and inspection of reflection; (4)facilitate an instructor's and learner's inquiry, review and comparison (Chang & Tseng, 2009a; 2009b). From the argument given above, online reflection is not only convenient for learners to proceed with reflection but also helpful for learning.

Effects of reflection

Regarding the effects of reflection on learning achievement, Costa and Kallick (2000) argued that a learner who was more likely to proceed with reflection would better control his/her thinking and inference and will therefore have better communications with peers and teachers. The inference performance has also been confirmed in other studies. Murphy (2004) selected nursing school freshmen as study subjects and found that the inference performance of students with reflection activities was superior to that of students without reflection activities. Yancey (2001) suggested that the reason why advocates supported the selection of portfolio was they believe a learner could review how he/she overcame learning difficulties when writing reflection and therefore could improve an individual's learning outcome. In conclusion, reflection is helpful for thinking, inference, diagnosis and learning.

Regarding the effects of reflection on attitude and meta-cognition, Saito and Miwa (2007) found in their study that the experimental group with reflection activities is superior to the control group in data collection. Gama (2004) developed a solution for environmental issues with algebra and incorporates e-reflection assistant. According to his study, reflection provided by the e-reflection assistant can improve learning outcome, time management skill, and knowledge application ability. Irby and Brown (1999) supported that reflection, if carried out continuously, could boost the performance of self-managing tasks. These studies show that reflection may enhance data collection performance, time management skill, knowledge application ability, learning ability, and learning attitude, etc.

From the discussion provided above, reflection has a wide range of effects which can be observed from some aspects. This study assesses reflection effects from three aspects: achievement test, work and attitude. Achievement test can indicates a student's learning achievement; work is a necessary item in a learning portfolio; and attitude shows a student's meta-cognitive abilities.

Assessment of Reflection

Categories of reflection

Chirema (2007) analyzed reflective journals to determine the three categories of reflection: non-reflection, reflection, and critical reflection. Wood, King, Kitchener, and Lynch (1994) and Wood (2000) also proposed three categories of reflection: pre-reflective thinking, quasi-reflective thinking, and reflective thinking, which may be used to differentiate between learners with different levels of reflection. These studies unveil that the reflection levels of senior high school students concentrate on pre-reflection. Santos (1997) interviewed 28 learners and studies their cognition on reflection. He found that a learner can reflect on their learning from reviewing process – the learner prevents his/her mistake from recurring by reviewing past works; contemplative process – the learner spends time contemplating himself/herself; comparing process – the learner compares the goal established initially and the ultimate result to determine whether the expected goal is achieved; and judging process – the learner evaluates the merits and demerits during self-learning. In short, reflection can be categorized into inspection, thinking, contrast, and evaluation.

By the nature of reflection content, Wang (2002) classified reflection into descriptive reflection, dialogic reflection, and critical reflection. Based on undertaking of reflection, Grossman (2009) categorized reflection into content-based reflection, meta-cognitive reflection, self-authorship reflection, and transformative or intensive reflection. Lee (2002) suggested that reflection was a psychological activity of meta-cognition and could be divided into three types: cognition, comparison, and evaluation. By characteristics, Lin (2004) divided a learner's reflection into emotional reaction, cognition and combination. In her study, Lin also found that learners would express their feeling and emotion by selecting terms which they frequently use. Therefore, it is possible to further explore a learner's reflection by characteristics of his/her behavior (i.e. status of cognition, evaluation, memory, or emotion).

With different study purposes, study processes, inductive methods and learner level, the designations of categories of reflection are not the same; however, there are several common designations such as emotion, memory, cognition, contrast, evaluation, and combination, which can serve as the basis for categorization in this study. The contrast category of reflection indicates the comparison, contrast and review of learning between the learner himself/herself versus his/her peers. The evaluation category of reflection indicates comments, measurement and criticism in addition to comparison, contrast and review. As evaluation includes the implication of contrast, we may incorporate the category of contrast into the category of evaluation in case of few study subjects.

Assessment Rubrics of Reflection
Teachers at South Brunswick Schools, New Jersey, USA used rubrics of reflection evaluation for assessing reflection writing in student portfolios. The assessment includes the following items: reflection objectives – clear descriptions of key points and suggestions and listing the importance of well defined themes or tasks; supportability – clear descriptions of evidence provided and effective demonstration of major arguments; organization – clear introduction, together with logic and clear inference for conceptual development; syntax – well-organized syntax, namely sentences in proper length without error; wording and diction – strong wording with a wide range of diction; and writing skill – correct spelling, correct use of punctuation, capital letters, and grammar, without obvious errors (King-Shaver, 1999). The first two items are highlighted as key points and evidence; the other four are about writing (even the first two are also associated with writing). The emphasis on writing skills will give high scores of reflection to those who have better writing abilities or skills. In addition, learning progress, learning outcomes, learning attitude and peer feedback are not substantially included, which is an inadequacy in that assessment model.

According to Tomkinson (2002), items used to examine reflection may include learning achievement, progress with learning tasks, defects of progress with whole programs, current learning situation, merits or demerits from other's feedback, chances for re-choice, chances missed, reasons to success, reasons to failure, learning difficulties, required development, required support, support sources, learning sources, and future plans. These items seem chaotic; it would be better if they can be classified into some aspects or constructs. Sparks-Langer, Simmons, Pasch, Colton, and Starko (1990) argued that questions or solutions proposed by learners were indispensable elements, because learners would not know what to do next if they do not understand what problems they encounter or how to solve the problems.

From the foregoing argument, the rubrics of reflection evaluation have two major aspects: writing skill and content quality. Content quality includes key points, evidence and examples, learning achievement, learning situation or experience, feedback from others, chances for learning or growing, reasons to success or failure, learning difficulties and solutions, required development and support, future plans, and improvement, etc. There are diversified evaluation indicators for content quality. As the assessment items listed above do not address reflection in portfolios, they do not involve the content items (or entries) of a portfolio, e.g. reflection on learning goals, reflection after reviewing peers' portfolios. This study examines reflection written by students when they are creating their portfolios, rather the reflection without portfolio. Thus, the evaluation of reflection quality in this study will integrate the above-mentioned evaluation rubrics (i.e. reflection on learning outcomes, reflection on learning attitude, reflection on the feedback from peers, improvement) and reflection based on portfolio entries.

METHOD

Subjects

This study targets at 45 eight-grade students (24 males and 21 females) as subjects who study a course of "Computer Application" at some junior high school in the Taiwan. The average of the student age is 14. The duration of the study was a 10-week period with 3 hours for each week. The students may spend more time creating their works except for classroom time. The students have not been involved in a Web-based portfolio assessment system before the study. Through the system, these students write reflection, and join self-assessment and peer-assessment. Their teacher conducts reflection teaching and various activities such as review and assessment of student portfolios. These students have sufficient computer operations and Internet skills for using the system since they have learned computer for one year.

Learning contents are based on two course units "Computer Animations" and "Time Axis Control" in the textbook, and works are created by Photoimpact and Dreamweaver MX. As students have to submit their digitalized works in the two course units, the system is ideal for review of the works and learning processes. The students were not informed that they were participating in a study in order to avoid the so-called Hawthorne effect and John Henry effect.

Research Framework

This study conducts phrase processing for the reflection content with the Phrase Processing System developed by the Institute of Information Science (2007), Academia Sinica and then proceeds with organization and categorization based on the results of phrase processing, and ultimately uses MANOVA to test whether there is any significant difference in learning outcome (achievement test, work and attitude) between learners with different categories of reflection and different reflection qualities, and further verifies the statistical results by the reflection in learners' portfolios. Research framework is shown as Figure 1, while research variable are as follows.

1. Categories of reflection, which are obtained from phrase processing results and analysis. They include emotion, memory, cognition, evaluation, and combination. The emotional category of reflection represents the learner's description of his/her learning or his/her peers' learning; it is simple emotional reaction without in-depth descriptions. Mnemonic reflection means only the learner's description of his/her learning or his/her peers' learning, without further review. The cognitive category of reflection indicates the learner's review of his/her learning or his/her peers' learning, while no further comment or criticism is made. The evaluation category of reflection indicates the learner's comment or criticism on his/her learning or his/her peers' learning. The combination category of reflection means a minimum inclusion of any two categories described above. These categories of reflection do not involve the merits and demerits of reflection and are classified as nominal variables in statistical application.
2. Reflection qualities are rated based on the content of reflection measured by a reflection questionnaire (see details in the research instrument section).
3. Learning outcomes include scores of achievement test, work and attitude. The scores of a learner's work and attitude are average scores given for those two course units and are measured by the questionnaire of portfolio assessment in the Web-based portfolio assessment system. The score of achievement test refers to the score that a learner earns in the paper test at the end of the course.

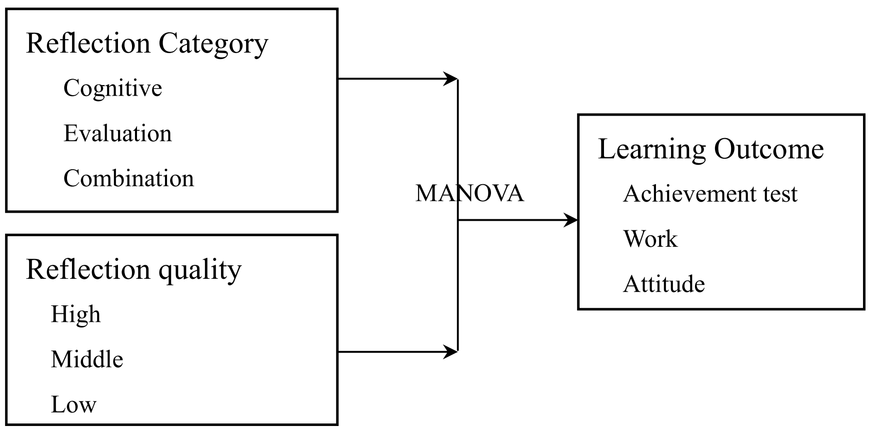

Figure 1 Research framework

Procedure and Activities

Preparation State (1st week)

The teacher teaches the concept, assessment methods and reflection writing skills of a portfolio to the students in the classroom. Besides, the teacher also demonstrates the use of the Web-based portfolio assessment system and the questionnaire of portfolio assessment. At the last part, learners may try using the system so that they may have an understanding of the system's functions and operations.

State of Course Unit #1 (2nd week to 5th week)

The teacher teaches Unit #1 (Computer animations) in line with the use of the Web-based portfolio assessment system. Learners may take advantage of spare time to participate various activities, such as individual portfolio creation (setting learning goals, online uploading works, and writing reflection, etc.) by form filling, viewing peers' portfolios, self-assessment, peer-assessment, and online discussion etc., in the Web-based portfolio assessment system. This process is known as portfolio assessment. Besides, the teacher and the online assistant use the questionnaire of portfolio assessment developed by Wu (2008) to evaluate the students' learning outcome (including work, reflection and attitude) based on their portfolio contents and online behavior performance at the end of the unit.

The student, together with a number of peers assigned by the teacher, uses the questionnaire of portfolio assessment for anonymous peer-assessment. Moreover, the teacher will offer guidance and answer questions raised by students regarding the use of the portfolio assessment and system on the discussion board within the system and during class. As for the activities of creating the works that are in students' portfolios, the assessment processes of the works are formative. Students have an opportunity to improve their works after receiving feedbacks.

Stage of Course Unit #2 (6th week to 9th week)
At this stage the teacher teaches Unit #2 (Time axis control) and repeats the activities described in Unit #2. Prior to the beginning of the stage, the teacher gives further guidance on the problems which learners have faced in the previous stage such as setting learning goals, writing reflection, uploading works, self-assessment, peer-assessment, use of portfolio assessment questionnaire.

Stage of Achievement Test (10th week)
There is an achievement test at the end of the two course units.

Procedure of Writing Reflection
During the course of the experiment, learners have to create their portfolios (including setting learning goals, uploading works, and writing reflection), and proceed with portfolio viewing and sharing, self-assessment, and peer-assessment, with the assistance of the Web-based portfolio assessment system. The procedures for writing reflection are provided below and the screen shots are shown as Figure 2.

1. The teacher explains the outline of reflection in the system to learners to help them write reflection.
2. Regarding the sequence of creating a portfolio, a learner first sets learning goals. After finishing the work, the learner writes reflection in accordance with outline of reflection provided by the system. The outline of reflection includes reflection on learning goals, reflection on learning outcomes, reflection on learning attitude, reflection on peer performance, and reflection on feedbacks.
3. When a learner writes "reflection on learning goals", he/she may review his/her learning goal established initially in the "Portfolio Creation" area, based on which the learner can write reflection.
4. When a learner intends to write reflection for "reflection on peer performance", he/she may browse their portfolios in the "Portfolio Assessment" area, view their online participation record and browse self-assessment, peer assessment and teacher assessment in the "Portfolio Scores" area; after comparison with peers' performances, the learner can write reflection.
5. When writing reflection for "reflection on feedbacks", a learner may think peers' comments or browse peers' feedbacks in the "Portfolio Assessment" area in advance.
6. When finishing writing reflection, the learner may click the "Send Data" button, and the system will automatically save the reflection in a personal portfolio. The learner may go to the "Portfolio Assessment" area to browse his written reflection or peers' reflection. In addition, the leaner may repeat the previous actions to write reflection for different thinking or outlines, if he/she feels that the content of reflection should be supplemented or re-written.

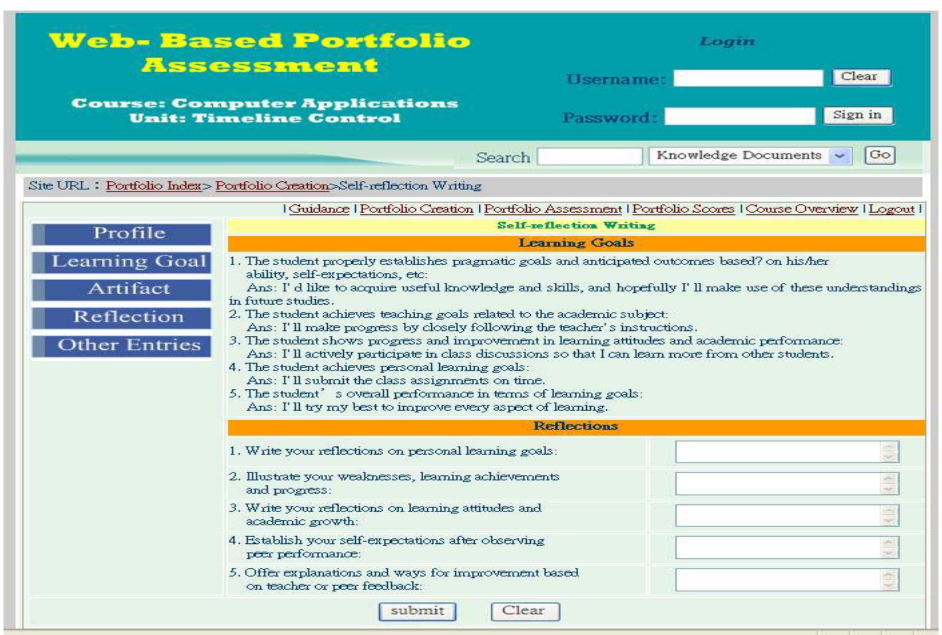

Figure 2 The screen shots of writing reflection

Research Instrument

Web-Based Portfolio assessment System

This study uses a self-developed Web-based portfolio assessment system for conduct of an experiment. Functionality of the system includes: 1. Guidelines for portfolio creation; 2. Portfolio creation: filling basic information, setting learning goal, online uploading works, writing reflection, and other content creation (e.g. anecdote, Website sharing, e-document sharing, achievement testing outcomes, or other entries, etc.); 3. Portfolio assessment: (1) may be distinguished by the student's name, work title, or work sample; (2) can be divided into teacher assessment, self-assessment, and peer-assessment, by the log-in ID, all of which use the same portfolio assessment questionnaire; and peer portfolios can be also browsed and reviewed; 4. Portfolio scoring: including scores of self-assessment, scores of peer-assessment and comments, scores of teacher assessment and comments, overall mean (teacher may set up the rate of teacher assessment, student self-assessment, and peer-assessment); excellent works are highlighted; 5. Course descriptions: including the names of course units, syllabus and teacher profiles, etc.; 6. System management; 7.Online discussion board (including course discussion and portfolio discussion); 8. Bulletin; and 9. Personal profile maintenance.

Questionnaire of Web-Based Portfolio Assessment

The teacher and the online assistant use the Web-based portfolio assessment questionnaire developed by Wu (2008) to assess students' learning outcome based on portfolios created by the students. The questionnaire consists of six aspects that are portfolio creation, learning goals, works, reflection, attitude, and other, and the score of portfolio assessment is equal to the sum of all the scores given for the six aspects. Three aspects (work, reflection, and attitude) are used to represent the learning outcome (dependent variable) in this study. Other three aspects (portfolio creation and learning goal, and other aspects) are not used in this study.

The scoring method of the questionnaire is given based on the performance that learners have achieved: 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5 and 5; the higher the score, the better the performance of assessment items.

Content of Questionnaire

Reflection Questionnaire

The reflection questionnaire in the portfolio assessment questionnaire is used to assess the contents of learners' reflection. The assessment items include (1) reflection on learning goals: proceed with reflection for the learning goals set initially; (2)reflection on works: the ideas about the generation process and outcomes of works; reflection on learning outcomes: listing the learner's learning achievement, demerits and progress; (3)reflection on learning attitude: merits/demerits of learning attitude, progress, and reflective thinking; (4)reflection on peer performance: self-expectations derived from the observation on peer performances; (5)reflection on feedback from the teacher, the online assistant and peers, and proposing improvement or explanation ; (6)overall reflection quality.

Work Questionnaire

The work questionnaire in the portfolio assessment questionnaire is used to assess the contents of learners' works. The assessment items are the validity of work, appropriateness of work, integrity of work, difficulties of work, originality of work, the degree that learners understand learning contents, evidences of work creating process (e.g. ground plan of work, initial work, revised work, and etc.), and overall performance on work.

Attitude Questionnaire

The attitude questionnaire in the portfolio assessment questionnaire is used to assess learners' learning attitude and interaction with peers. The assessment items are online viewing, browsing, peer-assessment, and feedback; online resource and information sharing; online discussion, knowledge sharing, idea exchange, and problem-solving; overall performance on attitude.

Validity of Questionnaire

Table 1 shows that values of KMO (Sampling proper measure of Kaiser-Meyer-Olkin) in each aspect of the questionnaire are larger than 0.7, reaching the standard for conduct of the factor analysis. Using its Principal Component Analysis (PCA) may establish validity and proceed with the orthogonal rotation using varimax mathod. The results of factor analysis indicated that the factor loadings of all items are greater than 0.3. Therefore, all items were remained. Six aspects with eigenvalues higher than 1 were extracted, but only three aspects were used in this study. Finally, explained variances are all larger than 70%, showing there is a high validity in each aspect. The overall explained variances of the two course units exceed 78%, which is similar to the overall explained variances (larger than 76%) of pilot test and formal test from Wu (2008). The questionnaire has a high validity, indicating its potential to effectively measure the quality of portfolios and learning outcomes of learners.

Table 1: Factor analysis of the Web-based portfolio assessment questionnaire

Aspect	Unit #1		Unit #2	
	KMO values	Explained variances (%)	KMO values	Explained variances (%)
Reflection	0.89	84.51	0.88	81.06
Work	0.80	80.00	0.85	82.61
Attitude	0.85	86.32	0.86	74.22
Overall	0.72	78.91	0.75	86.62

Note: The data of other aspects are not used and thus are not listed in this table.

Reliability of Questionnaire

All Cronbach's α values of the questionnaire on the two units of the course are larger than 0.9, suggesting high internal consistency between questions in the questionnaire. These results are quite similar to the reliability of the questionnaire measured by Wu (2008) (The Cronbach's α value of the pilot questionnaire test was 0.9, while the Cronbach's α value of formal questionnaire test was 0.923). Table 2 demonstrates Cronbach's α values of the work, reflection and attitude assessment questionnaires in the portfolio assessment questionnaire.

Moreover, inter-rater reliability of the questionnaire shows a high consistency between the teacher and the online assistant by using the Pearson's correlation ($r = 0.72$, $p<0.001$).

Table 2: Reliabilities of the aspects in the Web-based portfolio assessment questionnaire

Aspect	Cronbach's α value	
	Unit #1	Unit #2
Reflection	0.819	0.864
Work	0.914	0.970
Attitude	0.969	0.960
Overall	0.972	0.980

Note: The data of other aspects are not used and thus are not listed in this table.

Achievement Test

The achievement test, including 10 multiple-choice questions, is used to measure the degree that learners understand the two units of the course. The ten questions are selected from the teacher's manual, five from Unit #1 and the other five from Unit #2. The Cronbach's α value of the achievement test is 0.71, suggesting the consistency between the questions. Item analysis is conducted to identify the discriminatory power and consistency of the questions. According to the result of the t-tests, significant differences are found between the high and low-score groups of each question, indicating that these questions can effectively discriminate students' performances. Pearson's correlation coefficients between the questions and total scores are at the significant level, suggesting the consistency between the questions and the overall questionnaire. Table 3 demonstrates the determinant value (t value), correlation coefficient, and their corresponding significant values.

Table 3: Item analysis of achievement test

Attribution of achievement test	Item analysis	
	t (Sig.)	Correlation (Sig.)
Skill of axis control	6.01(0.00)	0.428(0.00)
Skill of animation	4.34(0.00)	0.386(0.00)
Skill of animation	6.35(0.00)	0.439(0.00)
Knowledge of axis control	9.42(0.00)	0.517(0.00)
Skill of axis control	7.12(0.00)	0.458(0.00)
Skill of axis control	7.89(0.00)	0.462(0.00)
Knowledge of animation	8.75(0.00)	0.489(0.00)
Knowledge of animation	4.01(0.00)	0.381(0.00)
Skill of animation	5.74(0.00)	0.407(0.00)
Knowledge of axis control	5.02(0.00)	0.401(0.00)

Phrase Processing System

This study uses the Phrase Processing System (Institute of Information Science, 2007) for phrasing the sentences in reflection. The lexical library in the system includes approximately 100 thousand words and phrases. With additional word types, term frequency, word frequency, and word-type frequency, this is the first phrase processing system that provides unknown word detection and syntactic category prediction. The system was awarded No.1 of the first phrasing contest held by the International Society of Computational Linguistic. The system was ever used in analyzing speech communication category (Chan, 2001). With high accuracy (96%) and consistency (Chen & Bai, 2000), it is ideal for processing massive reflection data in this study. In addition, the system can increase the reliability and validity and save labor and time on content analysis of reflection.

Besides, after phrasing sentences, the system will tag each word in student reflection. Principally, words are divided into dynamic verbs, situation verbs, and other word types (such as conjunction, adverb, noun, and pronoun, etc.). The dynamic verb means a verb which adverbial attributive can be such as very, strongly, extremely, …..etc. A verb beyond dynamic verb means situation verb. As dynamic verbs are not suitable for categorization of mental state theoretically in psycholinguistics, only situation verbs are selected and serve as the basis for categorization of reflection (Institute of Information Science, 2007).

The following lists the process of reflection categorization using the Phrase Process System:

1. The contents of reflection were uploaded to the Phrase Process System.
2. The Phrase Process System dealt with this part of work by marking up the words in the reflective journals with corresponding part-of-speech tags.
3. The researchers specifically focused on various types of stative verbs, e.g. intransitive verbs, causative verbs, transitive verbs, etc.
4. The researchers, with the help of Mandarin teachers and expert, worked together on grouping up vocabulary (i.e. stative verbs) into types, and counting the frequency usage of each type of words within a reflective journal.
5. Three types of reflection were ultimately determined based on a self-developed guideline (see details in the Section of Results and Discussion) after the researchers coped with overlapping classification of certain words, and wiped out barely used vocabulary types.

RESULT

Categories of Reflection

This study applies the Phrase Processing System to summarize the situation verbs used by each learner in his/her reflection and the occurring frequency. Afterwards, each situation verb is transferred to a mental lexicon (emotion, memory, cognition, or evaluation) by two linguistic experts and occurrence numbers are counted.

The following formulation is used to verify the consistency between the two experts. In terms of the total transfer from situation verbs to mental lexicons for all students, the consistency between the two experts is sufficient. In terms of the transfer for each student from situation verbs to mental lexicons, the consistencies between the two experts are all sufficient.

Percent of consistency = 2 × number of consistency / total number of transfer

$$= 2 \times 2139 / (2516 + 2516) = 4278 / 5032 = 0.85$$

Three types of reflection were ultimately determined based on self-developed guidelines after the researchers coped with overlapping classification of certain words, and wiped out barely used vocabulary types. The detailed guidelines are as follows: (1)Cognition type refers to those reflective authors who are inclined to cognition words comparing to evaluation, and the rest two vocabulary types are barely occurred in this case. (2)Evaluation type talks about a reflective author who dominantly selects evaluation words over cognition, whereas the other two vocabulary types are barely used. (3)Combination type includes two kinds of circumstances of vocabulary use. It covers those who use nearly equal amount of cognition and evaluation words, and the rest two vocabulary types are scarcely used. Secondly, reflective authors can be also labeled as combination type if three or more types of vocabulary are found, and each type should be responsible for over 10% of word use.

Initially, the categorization of reflection was determined by the degree to which each vocabulary type (emotion, memory, cognition, or evaluation). It was discovered, however, emotion and memory words were nearly invisible in students' journals. In light of this, we then proposed a 3-category scheme consisting of *cognition, evaluation* and *combination* in which emotion and memory were not put in. Table 4 shows the distribution of the number of learners for reflection categories, where the cognition category accounts for the largest percentage, which coincides exactly with the result proposed by Lee (2002) and Lin (2004).

Table 4: Distribution of the number of learners for reflection categories

Reflection category	Number of learners	Percentage
Cognition	24	53.3
Memory	0	0.0
Emotion	0	0.0
Evaluation	9	20.0
Combination	12	26.7

Effects of Reflection Categories on Learning

The Levene's tests of variance homogeneity on the three categories of reflection for the three learning outcomes (achievement test, work and attitude) are all not significant, meaning the variances between the three categories of reflection for the three learning outcomes are all the same. The result coincides with the assumption of MANOVA. Table 5 shows that the achievement test and work scores of the cognition category of learner reflection are all greater than those of the other two categories of learner reflection. Likewise, the attitude score of the evaluation category of learner reflection is greater than that of the other two categories of learner reflection. However, Table 5 shows that their significant levels are all not reached, meaning that reflection category does not influence achievement test, work and attitude.

Table 5: MANOVA of learning outcome for different categories of reflection

Wilk's Λ	Learning outcome	Mean (SD)			F	Sig.	Effect size
		Cognition	Evaluation	Combination			
0.863 (0.702)	Achievement test	59.38(18.96)	53.00(14.83)	56.11(19.00)	0.256	0.776	0.019
	Work	74.88(6.01)	73.60(3.36)	72.56(5.90)	0.496	0.614	0.035
	Attitude	63.12(7.94)	64.00(5.24)	57.67 (9.80)	1.519	0.237	0.101

Effects of Reflection qualities on Learning

Based on the quartile approach (Q1=65.5, Q3=79), the learner reflection qualities were divided into high scores group (front 25%), middle score group, (middle 50%) and low score group (rear 25%). The Levene's tests of variance homogeneity on the three groups of reflection quality for the three learning outcomes (achievement test, work and attitude) are all not significant, meaning the variances between the three groups of reflection quality for the three learning outcomes are all the same. The result coincides with the assumption of MANOVA. The result of MANOVA reveals (Table 6, Wilk's $\Lambda = 0.449$ and $p<0.01$), there is a significant difference in at least one learning outcome among the three groups of reflection quality. Furthermore, the difference in achievement test ($p=0.005$), work ($p=0.006$), and attitude ($p=0.025$) among the three groups of reflection quality are all significant, meaning reflection quality influences achievement test, work and attitude. According to post multiple comparisons among different groups using Scheffe's approach (Table 7), the achievement test, work and attitude of the high score group of reflection quality are all greater than those of the low score group of reflection quality. This result reveals that reflection quality has positive effects on learning outcome.

According to the effect sizes, the effects of reflection quality on the three kinds of learning outcome in a step-down sequence are achievement test, work, and attitude respectively. The three kinds of effects are all significant, while the effects on achievement and work are quite approximate.

Table 6: MANOVA of learning outcome for different groups of learner reflection quality

Wilk's Λ	Learning outcome	Mean (SD)			F	Sig.	Effect size
		High score	Middle score	Low score			
0.449 (0.002**)	Achievement test	72.78(17.87)	50.36(14.34)	51.43(13.14)	6.621	0.005**	0.329
	Work	78.56(4.36)	72.57(3.34)	70.86(7.24)	6.270	0.006**	0.317
	Attitude	66.22(10.05)	61.93(6.01)	55.14 (6.67)	4.248	0.025*	0.239

**p<0.05, **p<0.01*

Table 7: Post multiple comparisons of learning outcome among different groups of learner reflection quality

Learning outcome	Post multiple comparisons (Sig.)
Achievement test	High score group > Middle score group (0.007**)

	High score group > Low score group (0.033*)
Work	High score group > Middle score group (0.023*) High score group >Low score group (0.013*)
Attitude	High score group > Low score group (0.025*)

**p<0.05, **p<0.01*

DISCUSSION

Regarding the effect on learning outcomes, the reflection category has no significant effect on the three types of learning outcome, but the reflection quality has a significant effect on the three learning outcomes. On effect sizes, the effects of the reflection quality on the learning outcome, in descending order, are achievement test, work, and attitude.

The reflection categories concluded in this study are cognition, evaluation and combination. In case of more categories, the reflection category may possibly have effects on the learning outcome. According to the study by Lee (2002), there are significant differences between learners of different reflection categories in understanding of chemical concept. Whether it can be attributable to different reflection categories concluded by Lee requires further studies. As a learner writes in his portfolio:

"I never wrote reflection like this before. I have ever written diary before, but it seems that the reflection written in a portfolio is far different from diary. The diary I wrote before often lack meaningful reflection. Although I am not sure what kind of reflective learner I am, I can make sure that the reflection written in my e-portfolio is beneficial to my learning. No matter what type of reflection I wrote, I think it (reflection type) is not associated with my learning outcomes."

Reflection involves a learner's introspection and comments. Deeper reflection is helpful for learning (Blatt, Plack, Maring, Mintz, & Slmmens, 2007; Etkina, Karelina, Ruibal-Villasenor, Rosengrant, Jordan, & Hmelo-Silver, 2010; Gibson, Bernhard, Kropf, Ramirez, & Van Strat, 2001; Masui & De Corte, 2005). Therefore, it makes sense that reflection content has significantly positive effects on learning outcome, which is consistent with results from other studies that might focus on different fields of discipline or subjects. In attitude, the use of portfolio assessment may strengthen the students' motives for learning (McAlpine, 2000). In learning outcome, writing reflection journal can enhance scientific literacy of pre-service teachers (Gibson, Bernhard, Kropf, Ramirez, & Van Strat, 2001). Reflection will also boost self-learning effectiveness (Yancey, 2001). As a learner writes in his portfolio:

"*While writing reflection, I think of whether there is a room for improvement on my learning situation, learning attitude, works, and test scores. After finishing the writing, occasionally I will try to improve myself based on the reflection, hoping to make my learning outcome better than ever. Therefore, reflection is somewhat helpful for my learning*."

CONCLUSION AND IMPLICATION

Conclusions derived from this study are illustrated as follows. During the course of implementing the Web-based portfolio assessment, the effect size of reflection quality on learning outcomes was small but significantly positive. Follow-up contrasts found reflection quality significantly related to achievement test, work, and attitude outcomes. These results may serve as a reference for future researchers and teachers who are engaged in studies or teaching related to Web-based portfolio assessment. Through Web-based portfolio assessment, this study can also help learners boost their learning reflection skills so that they may become self-reflection practitioners in the future.

As the mental development of junior high school students is not yet completed and they lacked experience in writing reflection in previous courses, the learners' reflection content is either insufficient or superficial or they use ambiguous words, although an outline of the writing has been prompted and demonstrated in advance. Since most learners had no experience of self-assessment and peer-assessment before, the teacher has explained the scoring method and precautions, despite that, there is still possible unfair assessment or inadequate assessment capability. Moreover, because there are quite a few questions in the portfolio assessment questionnaire, each student has to rate a number of his or her peers, resulting in a heavy burden to the students. These are limitations of this study, which need to be eliminated as far as possible in future studies.

It is found in this study that reflection quality will affect achievement test, work and attitude; therefore it is necessary to reinforce the students' reflection writing capabilities. According to the recommendation proposed by Falls (2001), students may write reflection based upon assessment rubrics of reflection. In addition to convenience for writing reflection, it allows reviewing students' learning process and learning behavior easily from their reflections. Also, teachers may encourage students to review peer reflection as possible so they can observe and learn peers' reflection writing skills to improve their writing capabilities. Moreover, by reviewing peer reflection, the students may understand peers' learning processes and outcomes and serve as a stimulus for learning.

Falls (2001) argues that when students are writing reflection, the teacher should teach them how to write reflection and discuss writing skills, and students need more time to practice writing sophisticated reflection. From students' portfolios, we find the content of their reflections is not profound enough, therefore the reflection activities require more refined demonstration, guidance and support from teachers. As Stone (1998) suggests, it is difficult for students to write reflection, because reflection is a process needing assistance and guidance.

Despite the Web-based portfolio assessment system provides outlines for writing reflection and the teacher have explained reflection writing strategies, which have dramatically helped students write reflection, however, there are still a few students who use insufficient words when writing reflection or use inappropriate words in their reflection. If the system offers suitable or frequently used words or phrases, not only the writing of reflection will be improved but also the quality of reflection will be further boosted.

This study induces categories of reflection simply based on the words and phrases in the reflection, without in-depth exploration of reflection through the content analysis or discourse analysis. What messages are shown in reflection? Do the messages reflect the students' introspection? Can they reflect the students' improvement in learning? These are all critical issues that should be addressed in follow-up studies.

REFERENCES

Avrramidou, L., & Zembal-Saul, C. (2002). *Exploring the influence of web-based portfolio development on learning to teach elementary science.* Paper presented at the Annual Meeting of the National Association for Research in Science Teaching, New Orleans, Louisiana.

Barrett, H. C. (2004). *Electronic portfolios as digital stories of deep learning.* Retrieved August 18, 2009, from http://electronicportfolios.com/digistory/epstory.html.

Barrett, H, & Garrett, N. (2009). Online personal learning environments: Structuring electronic portfolios for lifelong and life wide learning. *On the Horizon, 17*(2) 2009, 142-152.

Barrett, H. (2010). Balancing the two faces of ePortfolios. *Educação, Formação & Tecnologias*, *3*(1), 6-14.

Blatt, B., Plack, M., Maring, J., Mintz, M., & Slmmens, S. (2007). Acting on reflection: The effect of reflection on students' clinical performance on a standardized patient examination. *Journal of General Internal Medicine, 22*, 49-54.

Campbell, L., Campbell, B., & Dickinson, D. (2002). *Teaching and learning through multiple intelligences.* Needham Heights, MA: Allyn & Bacon.

Chan, C.-W. (2001). *The relationship between speech communication category of president of junior high school and leadership behavior*. Unpublished master thesis. Tonghuang university, Taiwan.

Chang, C. C. (2008). Enhancing self-perceived effects using Web-based portfolio assessment. *Computers in Human Behavior, 24*(3), 1753-1771.

Chang, C.-C., & Tseng, K.-H. (2009a). Using a Web-Based Portfolio Assessment System to Elevate Project-Based Learning Performances. *Interactive Learning Environments, 16*(2), 25-37.

Chang, C.-C., & Tseng, K.-H. (2009b). Use and performances of web-based portfolio assessment. *British Journal of Educational Technology, 40*(2), 358-370.

Chen, K. J., & Bai, M. H. (2000). Unknown word detection for Chinese by a corpus-based learning method. *Computational Linguistics and Chinese Language Processing, 3*(1), 27-44.

Chen, N. S., Kinshuk, Wei, C. W., & Liu, C. C. (2010). Effects of matching teaching strategy to thinking style on learner's quality of reflection in an online learning environment. *Computers & Education, 56*(1), 53–64.

Chirema, K. (2007). The use of reflective journals in the promotion of reflection and learning in post-registration nursing students. *Nurse Education Today, 27*(3), 192-202.

Coombe, C., & Barlow, L. (2004). The reflective portfolio: Two case studies from the united arab emirates. *Forum Online, 42*(1). Retrieved November 1, 2009, from http://exchanges.state.gov/forum/vols/vol42/no1/p18.htm.

Costa, A. L., & Kallick, B. (2000). *Assessing and reporting on habits of mind.* Alexandria, VA: Association for Supervision and Curriculum Development.

Davis, E. A. (2000). Scaffolding students' knowledge integration: Prompts for reflection in KIE. *International Journal of Science Education, 22*(8), 819-837.

Eppink, J. A. (2002). The effect of web-based portfolio assessment strategies on the attitudes and self-perceived growth in music learning of non-music elementary general classroom educators in a basics of music

course. Unpublished doctoral dissertation. The University of Iowa, Iowa City, Iowa.
Etkina, E., Karelina, A., Ruibal-Villasenor, M., Rosengrant, D., Jordan, R., & Hmelo-Silver, C. (2010). Design and reflection help students develop scientific abilities: learning in introductory physics laboratories. *Journal of the Learning Sciences, 19*(1), 54–98.
Falls, J. A. (2001). *Using a reflective process to implement electronic portfolios*. Unpublished doctoral dissertation. Virginia Tech , Blacksburg, Virginia.
Gama, C. (2004). Metacognition in interactive learning environments: The reflection assistant model. *Lecture Notes in Computer Science, 3220*, 668-677.
Gibson, H., Bernhard, J., Kroof, A., Ramirez, M., & Van Strat, G. (2001). *Enhancing the science literacy of preservice teachers through the use of reflective journals.* Paper presented at the Annual Meeting of the National Association for Research in Science Teaching, St. Louis, Michigan.
Grant, A., Vermunt, J., Kinnersley, P., & Houston, H. (2007). Exploring students' perceptions on the use of significant event analysis, as part assessment process in general practice, learning how to use reflection in learning. *BMC Medical Education, 7*(1), 1-8.
Grossman, R. (2009). Structures for facilitating student reflection. *College Teaching. 57*(1), 15-22.
Herner-Patnode, L. M., & Lee, H.-J. (2009). A capstone experience for preservice teachers: Building a Web-based portfolio. *Educational Technology & Society*, *12* (2), 101–110.
Institute of Information Science (2007). *Phrase Processing System.* Retrived August 15, 2009 from http://ckipsvr.iis.sinica.edu.tw/.
Irby, B. J., & Brown, G. (1999). *A gendered dichotomy in written reflections in professional development portfolios.* Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, Canada.
King-Shaver, B. (1999). Reflective activities: Helping students sonnect with text. In L. Reid and J. N. Golub (Eds.), *Classroom Practices in Teachers of English* (pp.156-165). IL, Urbana: National Council of Teachers of English.
Lazear, D. (1999). *Multiple intelligence approaches to assessment*. Tucson, AZ : Zephyr Press.
Lee, H. Z. (2002). *Reflection and thinking of high school students' concept change on gaseous natures*. Unpublished master thesis, National Kaohsiung Normal Univeristy, Kaohsiung.
Lin, H. J. (2004). Reflection characteristics of nature science learning journal of the third grade students in elementary schools. Unpublished master thesis, National Tainun University, Tainun.
Masui, C., & De Corte, E. (2005). Learning to reflect and to attribute constructively as basic components of self-regulated learning. *British Journal of Educational Psychology, 75*(3), 351-372.
McAlpine, D. (2000). Assessment and the gifted. *Tall Poppies, 25*(1). Retrieved August 30, 2009, from http://www.tki.org.nz/r/gifted/pedagogy/portfolio_e.php.
Morgan, B. M. (1999). Portfolios in a preservice teacher field-based program: Evaluation of a rubric for performance assessment. *Education, 119*(3), 416-426.
Morris, J., & Buckland, H. (2000). *Electronic portfolios for learning and assessment.* Paper presented at the Annual Meeting of the Society for Information Technology and Teacher Education, San Diego, California.
Murphy, J. I. (2004). Using focused reflection and articulation to promote clinical reasoning: An evidence-based teaching strategy. *Nursing Education Perspectives, 25*(5), 226-231.
Paris, S. G., & Ayres, L. R. (1994). *Becoming reflective student and teachers*. Washington, DC: American Psychological Association.
Rees, C., Shepherd, M., & Chamberlain, S. (2005). The utility of reflective portfolios as a method of assessing first medical students' personal and professional development. *Reflective Practice, 6*(1), 3-14.
Saito, H., & Miwa, K. (2007). Construction of a learning environment supporting learners' reflection: A case of information seeking on the Web. *Computers & Education, 49*(2), 214-229.
Santos, M. G. (1997). Portfolio assessment and the role of learner reflection. *English Teaching Forum online, 35*(2), 10. Retrieved August 19, 2009, from http://exchanges.state.gov/forum/vols/vol35/no2/p10.htm.
Sparks-Langer, G. M., Simmons, J. M., Pasch, M., Colton, A., & Starko, A. (1990). Reflective pedagogical thinking: How can we promote it and measure it? *Journal of Teacher Education, 41*(5), 23-32.
Stone, B. A. (1998). Problems, pitfalls, and benefits of portfolios. *Teacher Education Quarterly, 25* (1), 105-14.
Tomkinson, B. (2002). *A reflective approach to teaching and learning. Teaching and Learning Support Centre.* Retrieved August 25, 2009, from http://ctls.concordia.ca/pdf/resources/reflective.approach.to.teaching.pdf.
Wang, M. L. (2002). *Exploration of teachers' reflection intelligence during teaching.* Unpublished master thesis, National Taipei University of Education, Taipei.
Wielenga, D., Kosters, J., & Ritzen, M. (1999). *EFA's digital portfolio system*. Paper presented at the AAHE Assessment Conference, Denver, Colorado.
Wood, P. K. (2000). *Summary of reflective judgment levels.* Retrieved October 9, 2009, from

http://web.missouri.edu/~wood/html/refl.judg.html.
Wood, P. K., King, P., Kitchener, K. S., & Lynch, C. (1994). Technical manual to accompany the reflective thinking appraisal: RTA Technical manual (1). In K. S. Kitchener (1994), *Assessing Reflective Thinking within Curricular Contexts* (pp.51-82). Washington, DC: Fund for the Improvement of Postsecondary Education.
Wu, M. F. (2008). *Reliability and validity of web-based portfolio assessment*. Unpublished master thesis, National Taipei University of Technology, Taipei.
Yao, Y., Aldrich, J., Foster, K., & Pecina, U. (2009). Preservice Teachers' Perceptions of an Electronic Portfolio as a Tool for Reflection and Teacher Certification. *The Journal of Educational Research & Policy Studies, 9*(1), 25-44.
Yancey, K. B. (2001). Digitized student portfolio. In B. L. Cambridge, S. Kahn, D. P. Tompkins, and K. B. Yancey (Eds.). *Electronic Portfolios - Emerging Practice in Student, Faculty, and Institutional Learning* (pp.15-30), Washington, DC: American Association for Higher Education Press.

EXAMINING THE SOCIAL INFLUENCE ON COLLEGE STUDENTS FOR PLAYING ONLINE GAME: GENDER DIFFERENCES AND IMPLICATIONS

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ABSTRACT
Online games represent a burgeoning market sector of increasing economic importance. However, most previous studies have focused on the utilitarian perspectives of the technology. In other words, there is limited the investigation to social influence on college students' attitude. The aims of this study is to understand the effect of social influence on college students' attitude in playing online game and to discuss gender effect of social influence on college students' attitude of playing online game. Focus group interview and survey of the mix research method were conducted. The authors find: (a) the effect of social influence affects college students' attitudes to online game. Female students are much easier to be affected than male ones, (b) Males tend to be more interested in playing online game than females, and (c) Gender difference might be caused by involvement and benefit while they play online game.
Key words: online game, social influence, focus group interview, social marketing

INTRODUCTION

The increasing use of the Internet at work and home has gained increasing popularity of online games among people of all ages (Griffiths et al., 2003). In 2003, the value of the global online games market was US$670 million, and online game revenues will reach US$9.8 billion by 2009 (Hsu and Lu, 2007). Online game market continues grows, a number of problems it brings to the teenagers deserve our notice. However, despite this huge increase in usage and the obvious market value, there has been limited research on consumer behavior with respect to online games.

Koo et al. (2007) discussed different factors to engagement with an online game: (i) concentration; (ii) enjoyment; (iii) escape; (iv) epistemic curiosity; and (v) social affiliation. Young (1996) posited that high-volume users of online chat rooms tend to suffer from increasing weak real-world interactions with their friends, families, and social activities (e.g., clubs and social organizations). Griffiths et al. (2004) found online game is essentially played for leisure and pleasure. Babin et al. (1994) indicated that hedonic values reflect the potential entertainment value and enjoyment that shoppers perceive in the experience of shopping. Hsu and Lu (2004) have implied that the extrinsic dimensions might not reflect the salient motives of players. In addition, the psychology of players are more inclined to be addicted to online games, such us low agreeableness, high loneliness and shyness and low self-esteem (Bianchi & Phillips, 2005). Hsu and Lu (2004; 2007) also concerned the cognitive and perceptual factors affecting attitude and behavior with online game users. Kraut et al. (1998) used statistical methods to show a negative correlation between Internet usage and communication with relatives and friends. Morahan-Martin and Schumacher (2000) found that, in the USA, pathological Internet undergraduate users were more likely to play online games.

Despite the rise of online games as a leisure phenomenon, there has been relatively little research into this area. Most of the research to date has tended to concentrate on the more negative aspects such as excessive play and addiction (Phillips et al., 1995), the effects of playing aggressive games (Griffiths, 2000), and the medical and psychosocial consequences (Griffiths, 1993). Thus, the image of a typical gamer (and the pastime of computer gaming) is seen as socially negative and remains firmly within a youth subculture.

A significant percentage of teenage online game enthusiasts spend so much time in virtual environments that they suffer from a number of serious social problems. Some spend more time in cyber cafeteria than they do in school or on school-related activities. Others imitate the violent or destructive behaviors that they observe in online games; extreme examples include murder and suicide. In Taiwan, a recent study showed that heavy users of online games have less fulfilling interpersonal relationships and higher levels of social anxiety than individuals who spend very little or no time playing online games (Shao et al., 2005). Tsai and Lin (2003) found

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that being addicted to the web and online game will cause a series of problems toward teenagers on their school grade, health, family, financial affairs and time management. Therefore, being addicted to play online games has become a serious social problem to most teenagers. Accruing evidence concerning the social influence of emotions in on-line game also currently lives in conceptual isolation: missing is an investigation into online game player's attitude.

In this study, we adopt the theoretical lens of Deutsch and Gerard's (1955) Dual-Process theory to determine the informational and normative factors that affected college students' attitude of playing online game. Moreover, the gender effect was also tested in the study. The main objectives of this research are as follows.
(1) Whether social influence can affect college students' attitude toward playing online games or not.
(2) Discussed gender effect of social influence on college students' attitude of playing online games.
(3) Explored the inconsistency between female college students' social influence and attitude through focus group discussion.

LITERATURE REVIEW

Social influence has long been an object of popular fascination and scientific research in such fields as social psychology structural and network analysis, sociology administrative science, organization theory, and distributed artificial intelligence. Social influence in group membership has important implications for understanding group decision-making. Ashforth and Mael (1989) through group action developed a perception of membership in a group. This social identification is an important component of group formation. A norm is considered to influence an individual's behavior. Empirical studies have found that social norms positively affect an individual's behavior (Teo & Pok, 2003; Venkatesh et al., 2003). Theoretically, individuals' perceptions of norms consist of two influences: informational and normative (Deutsch & Gerard, 1955). Even though normative and informational influence research has established a need to understand when normative versus informational influence will command discussion. Group members shift because of the opinions of others. Isenberg (1986) reports that both types of processes are necessary to account for the choice shift. In the body of normative and informational influence research it is important to apply a theoretical perspective that can account for both types of processes rather than only normative or informational influence.

Studies have demonstrated that different types of conformity operate depending on the extremity of the norm which differentiates between normative and informational manifestations of conformity. Deutsch and Gerard (1955) have identified three forms of social influence - informational, normative and value expressive. Social influence involves two facets: One is the subjective norms which refers to individual's perception of the expectations from significant others (Ajzen & Fishbein, 1977); the other is descriptive norms which refers to the perceptions of attitudes possessed by or behaviors of significant others (Rivis & Sheeran, 2003). Additionally, Kaplan (1989) defined normative influence as influence based on a desire to maintain group harmony or to elicit positive evaluations from others, and informational influence which is defined as influence based on a desire to make high quality decisions.

Classical research in social influence has shown that people's behavior is affected by perceptions of others' responses (Crutchfield, 1955). While extant literature establishes the existence and some characteristics of normative and informational social influence, more research is needed. Kiesler and Kiesler (1969) stated that conformity is a change in behavior or belief toward a group as a result of real or imagined group pressure, where group pressure is defined as a psychological force operating on a person to fulfill other's expectations of him or her. Harton and Latane (1997) found that social influence will affect adolescents' lifestyle attitudes such as holding after-school jobs, smoking and dating. Hsu and Lu (2004) have found that social norm is a critical factor and positively influences an individual's online game usage. Many studies also verified the effect of norms on intention to use Internet-related service (Hung & Chang, 2005; Luarn & Lin, 2005). These show that the social norm stems from the influence of reference groups. From a strategic perspective, the effective management of social influence requires an understanding of the type of social influence likely to prevail under different behavior of playing online games and the identification of individuals best positioned to exert such affection. Research is thus needed to establish the distinctive antecedents of the two types of social influence and differences between them with respect to the nature of the relationship between affection wielders and recipients. Addition to, there are few research discussed gender effect in playing online game.

CONCEPTUAL DEVELOPMENT

The relationship between informational social influence and attitude

Social information can signal the direction of an attitudinal norm (Fishbein & Ajzen, 1975). Informational influence refers to the provision of credible evidence of reality (Burnkrant & Cousineau, 1975). While consumers felt the need to make informed choices, they perceive the opinions or usage of products by those who are seen as credible as proof of a product's quality or characteristics. Frey and Meier (2004) used a mail fundraising campaign run by their university to show that social information increased participation rates. Shang and Croson (2005) provided complementary results and showed that social information can also increased the amount of charitable donations in college students and in the general population, respectively.

As Silverstein et al. (1986) found that information from the media and other sources has the power to affect attitudes about body shape and weight as well as the nature of appropriate eating behavior. Salancik and Pfeffer (1978) argued that informational social influence affects attitudes and behaviors. Accordingly, it is hypothesized that

H_1: Informational social influence will significantly affect college students' attitude to play online game.

The relationship between normative social influence and attitude
Cialdini et al. (1990) described these perceptions as descriptive norms, which specify what is typically done in a given setting (what most people do), and differentiate these from injunctive norms, which specify what behaviors garner approval in society (what people ought to do). Many studies have demonstrated the affection of descriptive and injunctive norms on subsequent behavior in varying situations. For example, norms have been shown to affect the choice of exercising during leisure time (Okun et al., 2002; Okun et al., 2003; Rhodes & Courneya, 2003), communication styles during wedding ceremonies (Strano, 2006), team-based innovations in the workplace (Caldwell & O'Reilly, 2003). If the norm is extreme and the subjects conform, the respective subjects are more likely to yield to normative, rather than informational influence. However, the norm is moderate and the subjects conform, then the respective are more likely to yield to informational influence (Lascu et al., 1995). Additionally, the relationship between social norms and behavior has also been shown for specific sub-populations like breakfast food choice among children (Berg et al., 2000), alcohol misuse among college students (Walters & Neighbors, 2005), and condom use among drug users (Van Empelen et al., 2001). Therefore, hypothesis 2 tests the effects of social influence from external others on college students' attitude of playing online game.

H_2: Normative social influence will significantly affect college students' attitude to play online game.

Gender Effect
A popular conceptualization of reference group influence views that form of social influence as being most pervasive for public as opposed to private goods (Bearden & Etzel, 1982), but does not differentiate between informational and normative influence. What appears in large measure to discriminate between public and private goods is their level of conspicuousness, a factor which would appear to be more relevant to the motives identified earlier as being associated with normative than with informational influence. While the relevance of conspicuousness to normative considerations has already been demonstrated (Fisher & Price, 1992), an objective of this study is to establish whether it differs between informational and normative influence situations.

Since most people have considerable experience in using the Internet and playing online game, the extent to which the usage of a product or service is seen by others does not relate directly to the functional benefits it delivers to the user, but may elicit judgments on the part of social observers. An American survey research by Lohr (1995) found that 67% of the Internet users are male. Another survey showed that 65% of the Internet users are wealthy males (McLeod, 1995). Tsai and Lin (2004) suggested that males tended to highlight the value of using the Internet as well as to display their ability to use it. In Taiwan, online game users are dominated by men at a ratio of 8:2. In other words, male has a higher percent in the percentage of gender to use the Internet than female. Conspicuousness, it expected to be associated more with normative than with informational social influence.

H3: Male college students' attitude to play online game are significantly better than Female.
H4: Female college students' attitude in normative social influence is higher than male.
H5: Female college students' attitude in information social influence is higher than male.

METHOD
This study used the mixed method of qualitative and quantitative research design, survey research and focus group discussion are conducted. The first task asked respondents to complete a self-attitude and self-behavior questionnaire about playing online game. A total of 280 (140 male, 140 female) college students who are major in business management in Taiwan is the research sample.

The social influence scale consisted of 12 five-point agree/disagree items (e.g., the opinions of my departmental faculty colleagues are important to me), half is about informational social influence, and another half is about normative social influence. Students' social influence was counted to get an average. When participant scored higher than the average, he/she got high social influence.

The attitude scale consisted of 3 five-point agree/disagree items based on the study of Hsu and Lu (2004). Average score and Cronbach's alpha for each variable were presented on Table 1. A higher-than-average score means positive attitude of playing online game; in contrast, a lower-than-average score means negative attitude of playing online game. Next, we assessed the internal consistency reliability by computing Cronbach's alpha, and the reliability test was well accepted. The SPSS statistics program was employed as the data analysis tool.

Table 1 Mean and Cronbach's α of the measurement

Variable	Mean	Cronbach's α
Informational social influence	3.60	0.87
Normative social influence	3.46	0.85
Attitude	3.16	0.86

In the second part, the researcher performed the qualitative study aimed at identifying key driver of social influence in our framework. We invited some players to involve the focus group discussion through online collection. The selection of participants was considered as been interested in playing online games. By doing so, we can gather their depth and rich data among various players. Because we relied on key informants, it was critical to select players who have playing experiences. Our qualitative sample consisted of an automated moderator and 10 voluntary participants (5 male and 5 female) with more than one year playing experiences and gave a participant NT500 (about $17 dollars) payment. Participants discussed via Skype and no more than 2 hours to complete all topics. Discussion appeared in windows on-screen with the participant assigned to the last speaker order (see Table 2).

Table 2 Focus group interview

The aims of the research	The topics to interview
To identify the participants is quality and open the participants' mind.	1. Could you describe your history of playing online game?
To identify what and why the player have fun with online game and involvement status	2. Do you enjoy the online game? 3. Would you like and keep playing online game? And Why? 4. Do you have any special game experiences? Please provide some examples?
To identify what and how social influence affect the players' attitude	5. Did you change the frequency and time when you get negative information from mass media? 6. What is your attitude about online game negative information from mass media? 7. Did you change the frequency and time when you are restrained by your social network like family, classmates, or friends? 8. What is your attitude when your family, friends, or other players provide negative information about online game?

The researcher was the moderator of the group discussion, and each participant was given an instruction leaflet before the interview. In the beginning of interview, the researcher asked the participant to describe yourself and your background of playing online game. The topics to interview ensured from the aim of this study were listed in the leaflet for the group discussion. Each participant was given a code name ranked from MA to ME for 5 male and FA to FF for 5 female.

RESULTS

The study sent out 280 questionnaires and gave a gift for respondents, the samples selected included 140 as male and 140 as female, each degree of college samples 70 respondents. A total of 209 valid questionnaires are obtained according to college students' experiences of playing online game. There are 149 participants who have been played online game, 12 of them are male and 51 of them are female. Near 71 % of the participants are online game players. The gender respondents of female to male with experience of playing online game is 1:5. The study used Chi-square test to test gender differences in social influence including informational social influence (Chi-square is 4.76, p-value is 0.029) and normative social influence (Chi-square is 19.89, p-value is 0.000). The results found that gender has a significant affection on social influence.

Table 3 Gender differences in social influence

	Informational Social Influence		Respondents
Gender	High	Low	
Male	45(39.1% within male)	70(60.9% within male)	115
Female	51(54.3% within female)	43(45.7% within female)	94
	Normative Social Influence		
Gender	High	Low	Respondents
Male	40(34.8% within male)	75(65.2% within male)	115
Female	61(64.9% within female)	33(35.1% within female)	94

Analysis the effect of attitude

The study used t-test to measure the impact of social influence on college students' attitude and behavior of playing online game. This analysis showed a significant result. Informational social influence has a significant impact on college students' attitude ($t = 2.31$, $p < 0.05$), and normative social influence has a significant impact on college students' attitude ($t = 3.88$, $p < 0.001$). Thus, hypothesis 1 and 2 were supported by the results.

Analysis the effect of gender

The results of analysis shown female college students' scores of attitude toward playing online game are lower than male college students'. Gender difference in college students' attitude ($t = 3.71$, $p < 0.001$) was significant. Two-ways ANOVA analysis was used to deal with the interactive impact of social influence and gender on college students' attitude of playing online game. The results indicate that informational social influence and gender have a significant interactive impact on college students' attitude of playing online game ($F = 8.98$, $p < 0.001$), and normative social influence and gender also have a significant interactive impact on college students' attitude of playing online game ($F= 12.31$, $p < 0.001$). Thus, hypothesis 3 was supported by this result.

Furthermore, the study used t-test to measure the effect of social influence on each group's attitude. It was found male has a higher percent in the percentage of gender to use the Internet than female, but female college students are much easier to be affected than male college students. Additionally, the result showed that informational social influence have a significant impact on female college students' attitude of playing online game ($t = 2.55$, $p < 0.05$), and normative social influence also have a significant impact on female college students' attitude of playing online game ($t= 2.76$, $p < 0.01$). Female has a higher social influence that male (see table 3). Thus, hypothesis 4 and hypothesis 5 were supported by this result. For the purpose of exploring the reasons for this result, this research used online focus group discussion as the research tool.

Focus group interview

Next, the study used focus group discussion to exploring the reasons for this result. This discussion considered two issues: 1. what and why the players have fun with online game? 2. what and how social influence affect the players' attitude? Two researchers encoded the interview messages independently to judge participants are positive vs. negative attitude and high vs. low social influence. In the focus group discussion, students' responses to each topic are encoded in the study (see Table 4).

Table 4 Results of the interview topics

	Quality test	Attitude evaluation			Social influence evaluation			
Participants	Topic 1	Topic 2	Topic 3	Topic 4	Topic 5	Topic 6	Topic 7	Topic 8
MA	○	+	+	+	-	-	-	-
MB	○	+	△	+	+	△	+	+
MC	○	+	+	+	-	-	-	-
MD	○	+	-	□	+	+	+	+
ME	○	+	+	□	-	-	+	+
FA	○	+	+	+	□	-	-	+
FB	○	+	+	□	+	□	+	+
FC	○	+	-	-	+	+	+	+
FD	○	+	-	□	+	+	+	+

FE	○	+	+	+	-	-	+	+

Note: + means positive attitude or high social influence, - means negative attitude or low social influence, ○ quality participant, □ two researchers coded inconsistency or can not judge

Attitude evaluation
Topic 1 is designed to identify the participants is quality and open the participants' mind. Topic 2, 3, 4 are designed to test participants' attitude which would be concluded to be positive or negative according to their responses to each topic. All participants agreed for topic 2 and 70% participants agreed for topic 3, were supposed to be having positive attitude. Others (MD, FC, FD) were supposed to be having negative attitude, FC changed positive to negative attitude, because she been affect cheated by friend of online game for topic 4. There are 6 participants agreed that the positive attitude were coming from the sense of achievement and entertainment while playing online games.

Social influence evaluation
According to the participants' responses to topic 5, 6, 7 and 8, the study attempted to understand their social influence. Their responses to the topics were concluded to be high or low social influence. Participants high agreed for topic 5 (MB, MD, FB, FC, FD), topic 6 (MD, FC, FD) and topic 7 (MB, MD, ME, FB, FC, FD, FE), and 80% for topic 8 which were supposed to be having high social influence. Others (MA, MC) were supposed to be having low social influence. Female college students would be more influenced by their boyfriends on the attitude to play online games which can be positive or negative. For participants with higher sense of isolation from reality, the sense of accomplishment and belonging will cause participants addicted to the online games.

Synergy effect
Participant MA, MC, FA and FE have positive attitude. Students with positive attitude considered that playing online game is not certainly improper behavior (MA-3, MC-3, FA-3 and FE-3). Addition to, they could obtain the sense of achievement from playing online games and commit their soul to it (MA-2, MC-3, FA-2). They also mentioned that they invested a lot of time and energy into playing online games, including obtainment of weapons and development of user levels (MA-2, MD-4, FA-2). On the other side, student ME and FE have low informational and high normative social influence. Participants with inconsistency between attitude and social influence, such as student MD and FB would reduce their frequency and time of playing online game because they were afraid of being scolded or losing solicitude from their parent or mate (MB-7, FB-8, FE-7).

Participant MA, MC and FA both have low informational and normative social influence. While students with low or positive informational social influence thought that information from mass media (MA-4, MC-6). However, students with low normative social influence thought that college student should have independent ideas (MA-1), and considered that online game is very attractive (MA-2, MC-2).

Participant MD, FC and FD have negative attitude. Often negative attitude towards online games implies a waste of time (FD-2) and engaged in other affairs such as attending school activities or going to cram school (FD-3), preparing for the exams and doing part-time job (MD-3, FD-3). Addition to, student MD and FD also have high informational and normative social influence.

CONCLUSION

Based on the above results of data analysis and focus group discussion, the study found conclusions as follows. The effect of social influence could significantly affect college students' attitude of playing online game. The effect of social influence (informational and normative social influence) could significantly affect college students' attitudes and behavior in playing online games. Female college students are much easier to be affected than male college students. Gender differences could significantly affect college students' attitudes in playing online games. Male college students tend to be more interested in playing online games than female college students.

A flow state is related to a person's motivation to do something. A person must see that there is something worthwhile to do and that he/she has the ability to do it (Csikszentmihalyi, 1990). College students see online game playing as a positive behavior (e.g. to ease their pressure; to while away their extra-time); and could earn psychological benefit from playing online game (e.g. the sense of achievement). Especially when mass information is broadcasting positive reports on online games, such as college students won international online game competition and earned money from selling treasures used for online games. This will improve the positive image and attitude of online games and promote the participation of college students

There are four participants have been addicted to online games and all of them have shown to have significant failure in real life. They are not aware of the situation until received warning from parents and teachers (two have low grades in classes and two have relationship problem). Therefore, social norms and interaction between friends would prevent being addictive to online games. Government should have regulation on teenager playing online games in internet café and work with college to do social marketing commutation. Social marketing forces to influence social behaviors not to benefit the company, but to benefit the target audience and the general society. Additionally, teachers and parents should pay more attention to students and maintain good level of interaction with them. This will help students to spend less time on online games and addict to it. With proper guidance, online games can be correctly used and developed.

REFERENCES

Ajzen, I., & Fishbein, M. (1977). Attitude-Behavior Relations: A theoretical Analysis and Review of Empirical Research. Psychological Bulletin, 84 (5), 888-918.

Ashforth, B. E., & Mael, F. A. (1989). Social Identity Theory and the Organization. Academy of Management Review, 14 (1), 20-39.

Babin, B., Darden, W. R., & Griffin, M. (1994). Work and/or Fun: Measuring Hedonic and Utilitarian Shopping Value. Journal of Consumer Research, 20, 644-656.

Bearden, W. O., & Michael J. E. (1982), Reference Group Influence on Product and Brand Decisions, Journal of Consumer Research, 9, 183-194.

Berg, C., Jonsson, I., & Conner, M. (2000). Understanding Choice of Milk and Bread for Breakfast among Swedish Children Aged 11-15 Years: An Application of the Theory of Planned Behavior. Appetite, 34, 5-19.

Bianchi, A., & Phillips, J. G. (2005). Psychological Predictors of Problem Mobile Phone Use. Cyber Psychology and Behavior, 8(1), 39-51.

Burnkrant, R. E., & Alain C. (1975), Informational and Normative Social Influence in Buyer Behavior, Journal of Consumer Research, 2, 206-215.

Caldwell D. F., & O'Reilly C. A. (2003). The Determinants of Team-based Innovation in Organizations the Role of Social Influence. Small Group Research, 34(4), 497-517.

Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A Focus Theory of Normative Conduct: Recycling the Concept of Norms to Reduce Littering in Public Places. Journal of Personality and Social Psychology, 58(6), 1015-1026.

Crutchfield, R. S. (1955) Conformity and Character. American Psychologist, 10, 191-198.

Csikszentmihalyi, M. (1990). *Flow: The Psychology of Optimal Experience.* New York: Harper Perennial Press.

Deutsch, M., & Gerard, H. (1955). A Study of Normative and Informational Social Influence upon Individual Judgment. Journal of Abnormal and Social Psychology, 51, 629-636.

Fishbein, M., & Ajzen, I. (1975). Belief, Attitude, Intention and Behavior: *An Introduction to Theory and Research.* Reading: Addison-Wesley.

Fisher, Robert J., & Linda L. P. (1992). An Investigation into the Social Context of Early Adoption Behavior, Journal of Consumer Research, 19, 477-486.

Frey, B. S., & Meier, S. (2004). Social Comparisons and Pro-social Behavior: Testing Conditional Cooperation in a Field Experiment. American Economic Review, 94 (5), 1717-1722.

Griffiths, M. D. (1993). Are Computer Games Bad for Children? The Psychologist: Bulletin of the British Psychological Society, 6, 401-407.

Griffiths, M. D. (2000). Video Game Violence and Aggression: Comments on Video Game Playing and its Relations with Aggressive and Pro social Behavior by O. Weigman and E.G.M. van Schie. British Journal of Social Psychology, 39(1), 147-149.

Griffiths, M. D., Davies, N. O., & Chappell, D. (2004). Online Computer Gaming: A Comparison of Adolescent and Adult Gamers. Journal of Adolescence, 27, 87-96.

Griffiths, Mark D., Davies, Mark N.O., & Chappell, D. (2003). Breaking the Stereotype: The Case of Online Game. Cyber Psychology and Behavior, 6(1), 81-91.

Hamilton, K., & Kalb, C. (1995). They Log on But They Can't Log Off. Newsweek, December, 18, 60-61.

Harton, H. C., & Latane, B. (1997). Social Influence and Adolescent Lifestyle Attitudes. Journal of Research on Adolescence, 7 (2), 197-220.

Hsu, C., & Lu, H. (2004). Why Do People Play On-line Games? An Extended TAM with Social Influences and Flow Experience. Information & Management, 41(7), 835-868.

Hsu, C., & Lu, H. (2007). Consumer Behavior in Online Game Community: A Motivational Factor Perspective. Computers in Human Behavior, 23(3), 1642-1659.

Hung, S. Y., & Chang, C. M. (2005). User acceptance of WAP services: Test of Competing Theories. Computer Standards & Interface, 27, 359-370.

Isenberg, D. J. (1986). Group polarization: A Critical Review and Meta-Analysis. Journal of Personality and

Social Psychology, 50, 1141-1151.
Kaplan, M. F. (1989). *Task, Situational, And Personal Determinants of Influence Processes In Group Decision Making.* In E. J. Lawler (Ed.), Advances in group processes, Greenwich, CT: JAI Press, 6, 87-105.
Kiesler, C. A., & Kiesler, S. B. (1969). Conformity. MA: Addison-Wesley, 7.
Koo, D. M., Lee, S. H., & Chang H. S. (2007). Experiential Motives for Playing Online Games. Journal of Convergence Information Technology, 2 (2), 37-48.
Kraut, P., Patterson, M., & Lundmark, V. (1998). Internet Paradox: A Social Technology that Reduces Social Involvement and Psychological Well-Being. American Psychology, 53, 1017-1031.
Lascu, D. N., William, O. B., & Randall L. R. (1995). Norm Extremity and Interpersonal Influences on Consumer Conformity. Journal of Business Research, 32 (3), 201-212.
Lohr, S. (1995). Inquiry Into Microsoft Plan Grows. New York Times, Business Day, C1, C3, Thursday, June 22.
Luarn, P., & Lin, P. H. H. (2005). Toward an Understanding of the Behavioral to Use Mobile Banking. Computers in Human Behavior, 21, 873-891.
McLeod, J. (1995). Taiwan tempts high-tech firms. Electronics.
Morahan, M. J., & Schumacher, P. (2000). Incidence and Correlates of Pathological Internet Use among College Students. Computers in Human Behavior, 16(1), 13-29.
Okun, M. A., Karoly, P., & Lutz, R. (2002). Clarifying the Contribution of Subjective Norm or Predicting Leisure-Time Exercise. American Journal of Health Behavior, 26(4), 296-305.
Okun, M. A., Ruehlman, L., Karoly, P., Lutz, R., Fairholme, C., & Schaub, R. (2003). Social Support and Social Norms: Do Both Contribute to Predicting Leisure-Time Exercise? American Journal of Health Behavior, 27(5), 493-507.
Phillips, C. A., Rolls, S., Rouse, A., & Griffits, M. (1995). Home Video Game Playing in Schoolchildren: A Study of Incidence and Pattern of Play. Journal of Adolescence, 18, 687-691.
Rhodes, R. E., & Courneya, K. S. (2003), Relationships between Personality, An Extended Theory of Planned Behavior Model, and Exercise Behavior. British Journal of Health Psychology, 8, 19-36.
Rivis, A., & Sheeran, P. (2003). Descriptive Norms as an Additional Predictor in the Theory of Planned Behavior: A Meta-Analysis. Current Psychology, 22 (3), 218-233.
Salancik, G. R., & Pfeffer, J. (1978). A Social Information Processing Approach to Job Attitudes and Task Design. Administrative Science Quarterly, 23 (2), 224.
Shang, J., & Croson, R. (2005). Field Experiments in Charitable Contribution: The Impact of Social Influence on the Voluntary Provision of Public Goods. Working Paper, University of Pennsylvania.
Shao, K. L., Chih, C. W., & Wenchang F. (2005). Physical Interpersonal Relationships and Social Anxiety among Online Game Players. Cyber Psychology and Behavior, 8(1), 15-20.
Silverstein, B., Perdue, L., Peterson, B., & Kelly, E. (1986). The Role of the Mass Media in Promoting a Thin Standard of Bodily Attractiveness for Women. Sex Roles, 9/10, 519-532.
Strano, M. M. (2006). Ritualized Transmission of Social Norms through Wedding Photographs. Communication Theory, 16, 31-46.
Teo, T. S. H., & Pok S.H. (2003), Adoption of WAP-Enabled Mobile Phones Among Internet Users. 31, 483-498.
Tsai, C. C., & Lin, C. C. (2004). Taiwanese Adolescents' Perceptions and Attitudes Regarding the Internet Exploring Gender Differences. Adolescence, 39(156), 725-734.
Tsai, C. C., & Lin, S. S. J. (2003). Internet Addiction of Adolescents in Taiwan: An Interview Study. Cyber Psychology and Behavior, 6, 649-652.
Van Empelen, P., Kok, G., Jansen, M. W. J., & Hoebe, C. J. P. A. (2001). The Additional Value of Anticipated Regret and Psychopathology in Explaining Intended Condom Use among Drug Users. AIDS Care, 13(3), 309-318.
Venkatesh, V., Morris, M. G., Davis, G. B., Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified Riew. MIS Quarterly, 27(3), 425-478.
Walters, S. T., & Neighbors, C. (2005). Feedback Interventions for College Alcohol Misuse: What, why and for Whom? Addictive Behaviors, 30, 1168-1182.
Young, K. S. (1996). Psychology of computer use: XL. Addictive Use of the Internet: A Case that Breaks the Stereotype. Psychological Reports, 79, 899-902.

EXPLORING STUDENTS' UNDERSTANDING OF ORDINARY DIFFERENTIAL EQUATIONS USING COMPUTER ALGEBRAIC SYSTEM (CAS)

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ABSTRACT
Ordinary differential equations (ODEs) are one of the important topics in engineering mathematics that lead to the understanding of technical concepts among students. This study was conducted to explore the students' understanding of ODEs when they solve ODE questions using a traditional method as well as a computer algebraic system, particularly Maple. Ten engineering technology students from the robotics and the mechatronics departments were selected as the research participants. Semi-structured interviews, observations, and students' written scripts were used for gathering the information regarding the use of Maple for solving the given ODE questions. The findings revealed that Maple could assist students in understanding the ODE lesson, especially in getting rid of tedious calculations as well as producing interactive activities while learning mathematics. Generally, students were able to figure out the relationship between mathematical understanding and real-life engineering applications. Some recommendations are made in order to promote the use of Maple among students, particularly in their final-year project.
Keywords: engineering mathematics, Maple, computer algebraic system, ordinary differential equation, technology

INTRODUCTION
Computer algebraic systems (CASs) have become an essential tool in making the teaching and learning process become more meaningful (Ittigson and Zewe, 2003). This idea has been extended by various researchers through studies that evaluate the benefit of using certain elements of CAS during the classroom process, especially for teaching mathematics. The CAS was introduced to the world of education in 1970 (Godarzi, Aminifar, and Bakhshalizadeh, 2009). Nowadays, there are several commonly used CASs in mathematics classrooms, such as Maple, Mathematica, Mathlab, and Mathcad. The justification of using Maple for this research is its availability as well as its user-friendly criteria. Moreover, Maple is useful for solving complicated mathematical problems in both numerical and symbolic forms. Hence, the integration of Maple in the teaching and learning of engineering mathematics will improve the students' outcomes. Technology has been widely incorporated in the teaching and learning of mathematics by most educators, including Meagher (2005); Kilicman, Hassan, and Husain Said (2010); Lua and Yang (1997); Kovacheva (2007); Godarzi, Aminifar, and Bakhshalizadeh (2009); and Slavit, Cooper, and LoFaro (2002). For instance, Slavit and colleagues (2002) conducted an experimental study with the purpose of identifying the effect of CASs on students' attitude and outcomes by using simulations and an instructional approach for teaching differential equations. The findings of their study revealed that students can conceptualize and analyze the ideas that lead to the solutions of differential equations. Godarzi and colleagues (2009) conducted another experimental study in order to determine the impact of Maple 12 on the teaching and learning of the double integral for 44 first-year students, focusing mainly on their procedural and conceptual understanding. The result revealed that the experimental group performed better in terms of conceptual and procedural understanding than the control group. As mentioned by Godarzi and colleagues (2009), conceptual and procedural understanding can be provided through activities using Maple. Conceptualization and computational representation methods are being introduced to students for solving various mathematics problems. Conceptual understanding can be developed through procedural understanding. A learning goal can be achieved if Maple is properly utilized in mathematics classrooms in order to ensure that students can grasp the desired concepts. This leads to an improvement in their attitude towards mathematics; gradually, they can develop the required understanding through the learning process (Kwon *et al.*, 2005).

Although there are many types of CASs in the field of education, Maple is considered one of the most powerful and is commonly used for teaching advanced mathematical topics such as calculus, linear algebra, vector computations, complex numbers, statistics, combinatorics, and number theory (Godarzi, Aminifar, and Bakhshalizadeh, 2009). As compared to the traditional method, Maple has made complicated topics such as multiple integrals easier to comprehend. As such, Maple is used for teaching advanced topics like multivariate calculus (Suanmali, 2008) and set operations (Kilicman *et al.*, 2010). The facilities that Maple provides, such as solving differentiation and integration step by step, plotting two and three-dimensional graphs, and animation features, enable the students to have a better learning engagement in a mathematics class. With all these features, Maple supports the students' understanding of ODE better than the traditional approach.

It is also widely known that mathematics and engineering complement each other in developing mutual understanding among students in the respective fields. Therefore, engineering mathematics has been taught to engineering students in order to provide them with mathematical knowledge and the ability to effectively use computational skills in engineering problems. Through a discussion with some mathematics lecturers at the Universiti Kuala Lumpur Malaysia France Institute, the researcher found out that tedious calculation, lack of basic understanding in calculus, and problems in visualizing the solution of mathematical questions (Godarzi, Aminifar, and Bakhshalizadeh, 2009) were among the common difficulties that students faced while learning ODEs. Hence, this study was conducted to investigate the students' understanding of ODEs when they use Maple.

MATERIALS AND METHODS

The research participants were ten engineering technology students who enrolled in an industrial automation and robotic program as well as a mechatronics program. The selection was based on the assessment for first-order ODEs; the assessment results were grouped into three categories: the lowest, the average, and the highest test score. Four students scored the lowest marks, three students scored average, and three students scored the highest marks. Only ten students were chosen because of the limited number of computers with Maple 13 in the laboratory as well as the willingness to participate in this study. These students have to enroll in the engineering mathematics course as it is a prerequisite for the control systems and robotics subjects. The engineering mathematics course consists of topics like differential equations, Laplace transforms, and Fourier series and is conducted three hours per week throughout the fourteen weeks per semester. As such, ODE is a fundamental concept in engineering modeling, including vibration and electrical circuits (Lawson 1997). Additionally, the high number of failures in every semester has become the justification to introduce Maple 13 in engineering mathematics.

The data was collected from three different sources, including observations, interviews, and analysis of students' written scripts. Three phases of the study were conducted by the researcher in order to ensure the research process was implemented successfully. The lecturer who participated in this study was a female lecturer with more than 15 years of teaching experience in the field of mathematics, especially at the diploma and degree levels. Her teaching style oriented more towards the traditional approach, and most of the tutorial sessions as well as the lectures were dominated by the lecturer. Since all the students were required to attend the lectures as well as the tutorial sessions, the activity was the same for all students in the first phase of the study. A quiz on first-order ODEs was given during the first phase of the study. The students' scores were ranked: three students got the highest marks, three average marks, and the remaining four students the lowest marks for the quiz. Their written scripts were analyzed, and the researcher interviewed them in order to get more detailed information. During the next session, the ten students were called to attend a Maple 13 training session that was conducted by the lecturer. The session lasted two hours, and the students were told to explore the software by themselves after the session. The third session was conducted with the intention of comparing students using an algebraic solution and students using Maple 13. The students were observed throughout the three phases, and we focused especially on the students' interest in using Maple during the mathematics class as well as the lecturer's readiness in integrating Maple in her teaching.

RESULTS

During the lecture on differential equations, which covers first-order ODEs, the students posed some questions to the lecturer. However, the questions revolved around basic integration that needs to be used for solving ODEs. When this happened, the lecturer gradually started to introduce several types of first-order ODEs with the intention that the students could distinguish among the different types of ODEs. The tutorial session was fully occupied since most students took the chance to ask questions as well as try tutorial questions. At the end of the first-order-ODE lesson, a quiz was given in order to test their understanding of the topic before proceeding to the second-order ODEs. The ten students were selected on the basis of their ranking on the given quiz. The students' written answers gave an idea to the lecturer regarding what should be included in the next lesson on second-order ODEs.

The second-order ODE was introduced by starting the lecture with the applications of ODEs in engineering applications such as vibration systems and circuit problems (Lawson 1997) so that the learning of second-order

ODEs becomes more meaningful. The tutorial session for the second-order ODEs was conducted upon the completion of each sub-topic related to second-order ODEs, including homogeneous ODEs and non-homogeneous ODEs. At this stage, more problems, especially those related to the specific method of performing integration, were encountered. The weak and average students were found to have problems in recognizing the suitable method for solving the integration. They were not able to complete the whole working solutions for the given questions. However, the good students seemed to enjoy the challenge as the questions became progressively more difficult. When they were given the application questions of ODEs in engineering problems, one of the good students was able to get the correct solution.

Next, all the written scripts were analyzed in order to identify the problems among the research participants in solving second-order ODEs. Three types of questions for this topic were chosen: one on homogeneous second-order ODEs, another on non-homogeneous ODEs, , (as shown in Table 1), and the other on the application.

Table 1: Types of second-order ODE questions

Type	Question
Homogenous	$\frac{d^2x}{dt^2}+6\frac{dx}{dt}+5x=0$
Non-homogeneous	$\frac{d^2x}{dt^2}+6\frac{dx}{dt}+5x=e^t$ with the given initial condition; $t=0$, $x=1$ and $\frac{dx}{dt}=\frac{3}{2}$

Going through the scripts, the researcher could draw a conclusion on the students' problems in understanding the lesson. Most students, except the good students, faced difficulties in producing the auxiliary equations such as $m^2+6m+5=0$ as well as writing a general solution and particular solutions. Using the given initial value problem (IVP) also created confusion among the students in producing a particular solution. To clarify the confusion, the next session on Maple training was conducted at the end of the lesson on ODEs.

The Maple session was handled by the lecturer since she had undergone Maple training before. She used a Maple worksheet for solving questions on integration and differentiation. The lecturer briefed the students on how to use certain features of Maple, such as menus, icons, and shortcut commands. Basic calculations on some commonly used expressions in mathematics can be carried out using the shortcut menus, as shown in Figure 1. For the session, a step-by-step approach was used in order to ensure that the students could follow the instructions. The lecturer has also mentioned the do's and don'ts of exploring Maple.

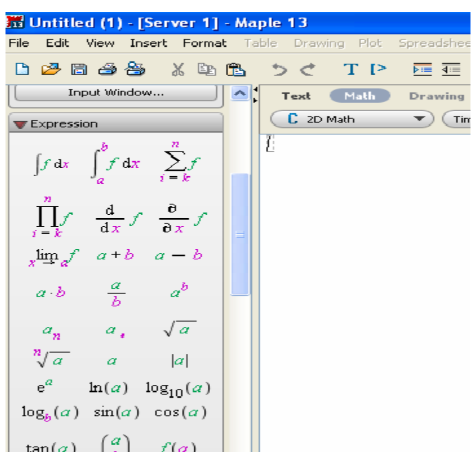

Figure 1. Some commonly used mathematical expressions in Maple 13.

Using similar types of questions as those given in Table 1, the lecturer requested the students to type the Maple commands that were shown on the whiteboard, which was projected by the LCD. Students were reminded to avoid mistakes, especially in the spelling of commands as well as spacing, in order to produce the same and correct answers. The following questions were given during the session:

> *with*(*inttrans*)

[*addtable*, *fourier*, *fouriercos*, *fouriersin*, *hankel*, *hilbert*, *invfourier*, *invhilbert*, *invlaplace*, *invmellin*, *laplace*, *mellin*, *savetable*]

Example 1

$with(plots):$

$ode := diff(x(t), t, t) + 6\,diff(x(t), t) + 5\,x(t) = 0$

$$\frac{d^2}{dt^2}x(t) + 6\left(\frac{d}{dt}x(t)\right) + 5\,x(t) = 0$$

$dsolve(ode)$

$$x(t) = \_C1\,e^{-5t} + \_C2\,e^{-t}$$

Example 2

$ode1 := diff(x(t), t, t) + 6\,diff(x(t), t) + 5\,x(t) = 2 + 3\,t$

$$\frac{d^2}{dt^2}x(t) + 6\left(\frac{d}{dt}x(t)\right) + 5\,x(t) = 2 + 3\,t$$

$dsolve(ode1)$

$$x(t) = e^{-5t}\,\_C2 + e^{-t}\,\_C1 - \frac{8}{25} + \frac{3}{5}\,t$$

Next, the lecturer let them solve ODEs for a particular solution, as shown in the next part. The justification of giving this question to them was to show the difference between the general solution and the particular solution of an ODE question. During this session, the students seemed to be enjoying the lesson. While doing the activity, the students were asked to compare their answers from the written scripts and the answer produced by Maple; all the comments were recorded by the researcher. Some of them started to try with different questions other than the chosen questions. They even asked the lecturer on how to get the graphical representation of the obtained function.

Determine the particular solution of ode1 from line (5)

$ics := (x(0) = 0, D(x)(0) = 1)$

$$x(0) = 0, D(x)(0) = 1$$

Example 3

$dsolve(\{ode1, ics\})$

$$x(t) = -\frac{9}{50}\,e^{-5t} + \frac{1}{2}\,e^{-t} - \frac{8}{25} + \frac{3}{5}\,t$$

The application question was discussed in the last session, and the lecturer recommended them to surf the information on engineering applications at Maplesoft Application Center, which can be found at http://www.maplesoft.com. The applications cover a variety of scopes in the field of engineering, as shown in Figure 2.

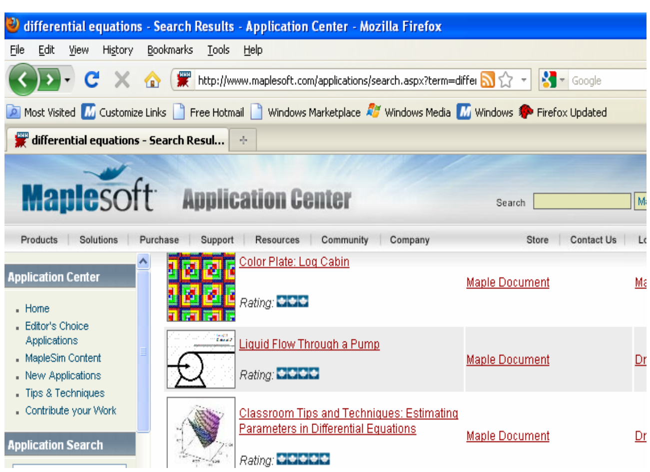

Figure 2. Screenshot of the Maplesoft Application Center.

DISCUSSION

The discussion is divided into three parts, which consist of the research participants, the lecturer, and Maple. The interconnection of all the components of the research will reflect their importance in making the teaching and learning process of ODEs a success. Firstly, most of the students are found to lack the basic understanding of calculus, which is considered a prerequisite for ODEs. Based on the given responses during the interview, the students face difficulties in remembering the methods learnt in integration and differentiation. This is consistent with what has been reported by Kwon, Allen, and Rasmussen (2005). They have a better understanding of procedural knowledge than of conceptual knowledge. The students are able to produce step-by-step explanation but are unable to provide justification. The learning process has been transformed from a directed approach to a non-directed approach by the introduction of the Maple training session. Most of them also found that using Maple was useful to them, especially in reducing the burden of having a series of long working steps. Since most of the ODE questions involved several steps in getting to the final solution, the use of Maple has provided them a better understanding of certain fundamental concepts like general solutions, complementary functions, and particular integrals. The additional knowledge was because of the graphical representation, which was not fully discussed during the tutorial. They also emphasized their preference in using Maple for the next mathematics class. Some comments for this preference include

"I think Maple should be used regularly in mathematics class."
"With Maple, I am able to solve all kinds of mathematics questions, probably…"
"Some special menus of Maple help me to understand integration better..."
"No more complicated working steps in order to solve mathematics questions."

Throughout the training session, the students were intentionally being guided to explore Maple by themselves. The students found that they were given adequate information on how to use Maple for solving questions related to integration, differentiation, and differential equations. With Maple, students managed to identify the appropriate method that can be used for solving any given mathematics question. Most of these students have problems in distinguishing the commonly used terms in ODEs, such as order, degree, homogeneous, non-homogeneous, auxiliary equation, complementary function, and particular integral. These terms are indirectly ignored by these students while the training is in progress because of some of the alternative features offered by Maple. These features include user-friendly criteria, graphical representations, and symbolic and algebraic manipulation.

Further, the lecturer's point of view in integrating Maple in her teaching and learning process has made the task easier than conducting the normal classroom process. Despite the fact that the students have a problem in basic calculus, the lecturer manages to build their confidence in solving ODEs using Maple. Although the lecturer has not fully mastered Maple, but the integration of Maple helps the students in making the learning of ODEs become more meaningful. She has to try out some of the questions using Maple before explaining them to the students. She seemed ready to integrate Maple in her teaching, but the conceptual understanding of ODEs is still a necessity for them. Maple can act as a tool, but the main aim would still be the procedural and conceptual understanding. Using Maple for teaching mathematics has created confusion to the lecturer on how to deliver the mathematical knowledge to the students (Aydin, 2005). The advantage of using Maple in her teaching is that it would enable the students to collaborate with other students for completing the given tasks. The communication changes to a two-way interaction of the lecturer and the students. The class becomes livelier because of the participation of all the students in exploring Maple than what the teacher expected. On the other hand, the lecturer should be aware that she has to make some modifications to her teaching because of some of the changes made during the classroom process (Schneider, 1999). They have to make sure that the students know what to do when Maple fails to provide the expected answer (Kovacheva, 2007).

Maple plays a number of important roles in ensuring a smooth teaching and learning process. One of these roles is that of a didactic resource for teaching mathematics (Galan Garcia *et al.*, 2005), particularly in relation to the conceptual understanding of differential equations and the real-life applications, which are mainly discussed in engineering. Clements (1997) has made a list of the roles played by Maple in the field of engineering, such as providing assistance in solving any related mathematics questions and enabling students to concentrate on concepts. Furthermore, Maple should be able to enhance students' learning in making connections between mathematics and engineering as well as sustaining the students' interest in mathematics. The graphical representation and some animation features in Maple should be able to fascinate the students (Buchanan 2003).

CONCLUSION

Although the outcome of this study shows that students are able to benefit from Maple with respect to solving ODEs, but the limitations should be taken into account. The lecturer should be aware that the relationship between the conceptual understanding and the techniques used in Maple would not be properly delivered to the students (Galan Garcia *et al.*, 2005). There is a possibility that a high student interaction with computers may result in a low student–lecturer interaction, which also has a subsequent effect on the process of socialization provided by the learning environment (Aydin, 2005). Moreover, the learning process can be passive; probably, it would encourage undesirable outcomes among students. They may have different interpretations during the process of exploring Maple for solving ODEs, particularly, because of the graphical representations. This is because of the role of computers in providing the students the complete answer while ignoring the process and the insights of the topic (Aydin, 2005). However, the integration of Maple in the teaching and learning of engineering mathematics, particularly for topics such as differential equations, would enhance students' understanding, increase interest in mathematics, and develop their creative thinking. The learning experience becomes more meaningful for students since Maple creates the opportunity for them to explore, investigate, and draw conclusions (Lua and Yang, 1997). Tedious and complex calculations can be done in minimum time, which enables the students to interact with other students as well as their lecturer. The unnecessary calculations can be neglected, and the students have the opportunity to understand important concepts while solving ODEs (Aydin, 2005). It can be concluded that there are many advantages as well as disadvantages of integrating CAS in a mathematics classroom. In order to be effective in using Maple in the mathematics class, the lecturers have to be well-trained in using Maple. More open training sessions on Maple should be offered to all students and lecturers in order to promote the use of Maple in education, mainly the engineering technology education. Thus, the integration of Maple in mathematics would lead to a new direction in making the learning of mathematics more meaningful and enjoyable.

REFERENCES

Aydin, E. (2005). The use of computers in mathematics education: A paradigm shift from computer-assisted instruction towards student programming. *The Turkish Online J. of Educ. Tech.*, 4(2): 27-34.

Buchanan, M. (2003). In Jenny Way & Toni Beardon. *ICT and Primary Mathematics*. Open University Press, Maidenhead, Philadelphia. Challenges of teaching with technology across the curriculum: Issues and solutions. Hershey: Information

Clements, R. (1997). Computer algebra for engineers: The Maple alternatives. *Eng. Science and Educ. J.*, 233-238.

Galan Garcia, J.L., Galan Garcia, M.A., Galvez Galiano, A., Jimenez Prieto, A.J., Padilla Dominnguez, Y., & Rodriguez Cielos, P. (2005). Computer algebraic system: A basic tool for teaching mathematics in engineering. *Proceedings of the International Conference on Multimedia and ICT in Education*, Lisbon, Portugal.

Godarzi, S.Q., Aminifar, E., & Bakhshalizadeh, S. (2009). The impact of using computer algebraic system (CAS) in teaching and learning of "double integral". *Proceedings of the Third International Conference on Science and Mathematics Education (CoSMEd)*, Penang, Malaysia.

Ittigson, R.J., & Zewe, J.G. (2003). *Technology in the mathematics classroom*. In Tomei, L.A. (Ed.). Science Publishing, 114-133.

Kilicman, A., Hassan, M.A., & Husain Said, S.K. (2010). Teaching and learning using mathematics software "The New Challenge". *Proc. Social and Behavioral Sc.*, 8: 613-619.

Kovacheva, T. (2007). Use of the Maple system in math tuition at Universities. *Inter. J. Info. Tech. and Knowledge*, 1: 363-368.

Kwon, O.N., Allen, K., & Rasmussen, C.(2005). Students' retention of mathematical knowledge and skills in differential equations. *Sch. Sc. and Math.*, 105(5): 227-239.

Lawson, D. (1997). The challenge of computer algebra to engineering mathematics. *Eng. Sc. Educ. J.* Dec, 228-232.

Lua, S.K., & Yang, W.C. (1997). Creating teaching and learning material in engineering mathematics using scientific workplace with external program link to Maple. [Retrieved Feb 23, 2010.]

Meagher, M. (2005). The processes of learning in a computer algebra system (CAS) environment for college students learning calculus. Doctoral Dissertation, The Ohio State University.

Slavit, D., Cooper, K., & LoFaro, T. (2002). Understanding of solution to differential equations through context, web-based simulations, and student discussion. School Science and Mathematics, December; *ProQuest Educ. J.*, 380-390.

Suanmali, S. (2008). Maple in mathematics. *Proceedings of the Fifth International Conference on Information Technology: New Generation*. IEEE Computer Society, 528-533.

EXPLORING THE RELATIONSHIP BETWEEN PURPOSE OF COMPUTER USAGE AND READING SKILLS OF TURKISH STUDENTS: EVIDENCE FROM PISA 2006

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ABSTRACT
Organization for Economic Co-Operation and Development (OECD) has conducted a series of educational assessments in many OECD and non-OECD countries to support their sustainable economic growth since 2000. These assessments are named Program for International Student Achievement (PISA); they focus on the capabilities of 15-year olds in three main subjects: mathematics, science, and reading. PISA also measures students' interests and tendencies toward information and communication Technologies. This study investigates the relationship between Turkish students' reading scores and their use of computers for educational and entertainment purposes across males and females, by using the data from PISA 2006. In order to examine the relationship between these variables, Structural Equation Modeling (SEM) is used in the study. Results of this study indicate that while the use of computers for entertainment purposes affects students' reading scores positively, the use of computers for educational purposes affects their reading scores negatively. Also, according to our results, there is not a statistically significant difference between male and female students in this relationship.
Keywords: Computer use, PISA-2006, Reading, Structural Equation Modeling (SEM).

INTRODUCTION

It is a well known fact that education plays a unique role in individuals' well-being and the development of societies. Well-educated people may possess sufficient knowledge about the world and usually are capable of planning for their futures and making the right decisions. At this point, it can be safely argued that having well-educated young individuals greatly influences the future of a nation since they can actively contribute to innovation in business and industry (Roberts, 1995). In accordance with this argument, the Organization for Economic Co-Operation and Development (OECD) has conducted a series of educational assessments in many OECD and non-OECD countries to support their sustainable economic growth since 2000. These assessments are named Program for International Student Achievement (PISA); they focus on the capabilities of 15-year olds in three main subjects: mathematics, science, and reading. This age group is selected because 15-year olds generally come to the end of their compulsory education in most OECD countries and should have acquired a certain amount of knowledge, skills, and attitudes (OECD, 2006).

PISA was performed first in 2000 and has been repeated every three years. Four assessments have been implemented thus far (in 2000, 2003, 2006, and 2009). In all these cycles, the number of countries participating in the assessment is different: 43 countries in 2000, 41 countries in 2003, 57 countries in 2006, and 65 countries in 2009. PISA assessments provide information about students' real-life knowledge and their preparedness for higher education levels and future adult participation in society. In other words, in addition to students' knowledge of the school curriculum, PISA addresses essential skills required in adult life. PISA also measures students' interests and tendencies toward Information and Communication Technologies (ICT), math, and science. Furthermore, PISA contains a great deal of data about characteristics of students, families, and schools. Hence, it allows researchers to investigate the relationship between different variables and students' achievement, and it makes possible comparing students' performances across a large number of countries.

Since its first implementation, a great number of studies have been conducted to analyze and interpret PISA results across many participating countries. Several studies which investigated Turkey's performance on these assessments have occurred as well. However, to our knowledge, all of these existing studies (Aypay, 2010; Ziya, Dogan, and Kelecioglu, 2010; Demir, Kilic, and Unal; 2010; Alacaci and Erbas, 2010; Anil, 2009; Unal and Demir, 2009; Altun, 2007; Ciftci, 2006; Duman, 2006; Yilmaz, 2006) focused on either the math or science performance of Turkish students. It is very interesting to see that none of the previous studies investigated the reading performance of Turkish students, although having good reading ability is known to be one of the most important and essential skills in life after formal school, including finding a good job. In addition, Turkish students' performances in reading were lower than all OECD countries, except Mexico, in both PISA 2003 and

PISA 2006. Hence, it can be claimed that there is an important gap in the literature in terms of analyzing Turkish students' reading performance in PISA and investigating the factors which may affect students' performance in reading.

Students' computer and internet use is also one of the important areas about which PISA contains information. It is not hard to imagine that using a computer has become an essential part of our daily life in the 21st century. People do a variety of their daily activities, including working, studying, communicating, and entertaining, by using computers. In addition, basic computer skills such as writing documents using in word processors, calculating formulas in excel sheet, and using communication tools, etc., should be known in order to find an occupation in most job markets. It is undeniable that both being able to use computers for different purposes and having effective reading skills are among the most important characteristics of well-educated people in today's world. Thus, it is very important for Turkey to investigate the relationship between students' computer usage and their reading skills in order to take the necessary steps toward improving students' achievement. At this point, PISA plays a key role because it indicates the students' reading skills and provides significant information about their accessibility to and use of computers. To this end, this study addresses how using computers for different purposes may affect students' reading scores across females and males in Turkey, by examining these variables from PISA's 2006 results.

LITERATURE REVIEW

Turkey has been implementing many reforms in its educational system recently in order to raise the quality of education and reduce inequalities between different sectors of society in terms of access to education (Aksit, 2007). These reforms started with extending the duration of compulsory education from five years to eight years in 1997. Then, in 2003 Turkey participated in PISA to assess the level of Turkish students' knowledge, figure out the place of their level, and determine the factors of students' achievement in the global world. At the same time, an important attempt was initiated with the aim of changing a long held curriculum which could not respond to students' needs anymore. This involved experts from OECD visiting Turkey in order to start the process of integrating contemporary technical and vocational standards into the curriculum, and to develop a high-quality curriculum which can meet the nation's needs. An important part of this process was to integrate Information and Communication Technology (ICT) into every school, and to secure fast internet connections to them, because this age is called the era of Information Technology (IT) (Ministry of National Education, 2005).

In this new era of IT, computers have become one of the essential parts of education. In recent years, computers and other ICT devices have been introduced into schools and teachers have been expected to use these devices in their instructions across the world (Ham & Cha, 2009). In accordance with this trend, almost all schools in Turkey have been equipped with computer technology. Even though it is hard to claim that all teachers effectively use technology as an instructional tool in practice, it is safe to note here that many activities have started to be implemented with computers and other ICT devices in Turkish schools and classrooms. In addition, many students either have their own computers and internet access at home or use internet cafes, which are very common in Turkey. As a result, most students in Turkey can use computers and the internet at various levels, and at least know basic computer components.

There is considerable amount of studies which show the benefits of the internet as a teaching and learning tool (Luan, Fung, Nawawi, & Hong, 2005). The internet helps students to learn in many different ways. It allows students to find information on a variety of topics, read news from all around the world, and communicate and share information with their friends. In general, the internet has made the earth a global village, and it saves a great amount of time. Furthermore, nowadays most students are motivated to use computers and the internet instead of reading books and listening to traditional lectures. Thus, using these tools in education can also motivate students and get their attention. Without a doubt, there are also some unplanned consequences of increased internet and computer use (Sharma & Maleyeff, 2003). For instance, students may spend most of their time on the internet and neglect their homework and other responsibilities. At this point, some parents and educators view the usage of computer and internet as a waste of time for students. However, using the internet and computers may also unintentionally support students' learning process because students do a variety of activities, such as reading, watching, writing, and thinking even if they are just using computers for entertainment purposes.

Although using ICT for either entertainment or learning purposes is an inevitable fact in today's world, it is also a necessity for young people to effectively read, write, and communicate with others in order to be successful in their adult life. At this point, reading is known as an important tool for developing an individual's mind and imagination. In addition, having effective reading skills and habits can be a key factor for students to develop their writing and communication skills. Thus, assessing students' reading skills and investigating factors which are related to these skills are very important steps for improving the reading ability and habits of coming generations. Because of many different reasons stated earlier in this paper, asking about the relationship between students' purposes of computer use and their reading skills is a legitimate question. In addition, many previous studies have indicated gender as an important predictor of students' reading achievement and use of computers. Hence, gender differences should be also taken into the account when investigating the relationship between computer use and reading skills. A significant number of studies about gender differences in reading and using computers have been conducted thus far. Many of these studies show that gender is a significant factor associated with students' reading performance, for example, girls get significantly higher scores than boys in standardized tests (Chiu & McBride-Chang, 2006). This difference between females and males students can be explained by various motivational and behavioral factors in their reading and learning processes (Logan & Johnston, 2010). Similarly, according to the literature, there is a difference about attitude towards the use of computers between females and males**.** The association between computer attitudes and computer experience is stronger for males than females (Lily, 1994). It has also been found that attitudes towards the internet are more positive for males than females (Durndell & Zsolt, 2002).

Even though this study is the first attempt to investigate the relationship between computer use and Turkish students' reading achievement in PISA, there are a few existing studies which analyzed the effects of computer use on Turkish students' achievement in mathematics and science. Ziya, Dogan, and Kelecioglu (2010) found that students' self-reliance in performing internet-related operations has a positive effect on their mathematical achievement scores, while students' using computers for program and software purposes has a negative effect on their mathematical achievement scores in PISA 2006. Erbas (2005) also found similar results for the relationship between computer use and the scientific literacy of Turkish students in PISA 2003. His findings indicated that the use of the internet and basic computer skills might have a positive relation with scientific literacy, but the use of software programs and advanced computer skills showed a negative relationship with scientific literacy. On the other hand, Aypay (2010) found no significant relationship between students' mathematic achievement in PISA 2006 and their use of computer software, as well as the use of computers for entertainment and internet purposes.

METHOD

Participants

Turkey has participated in PISA since 2003. However, only data from 2003 and 2006 cycles is currently available for Turkey, since the data of PISA 2009 has not yet been released. Hence, the latest available data, PISA 2006, was used in this study. PISA 2006 was implemented in a stratified random sample at 160 schools across 78 provinces in seven geographical regions of Turkey. For implementation of PISA 2006, 35 students from a list of all 15-year-old students in each school were randomly selected. The Turkish data for PISA 2006 had a sample of 4942 fifteen-year-old students (2290 girls and 2652 boys) attending 7^{th} (n=23), 8^{th} (n=93), 9^{th} (n=2007), 10^{th} (n=2671) and 11^{th} (n=148) grades.

Measurement and Variables

Two independent variables, students' gender and their purpose of computer use, were selected in this study to predict the Turkish students' reading performance. Five plausible reading values showing the students' reading performance in PISA 2006 are used as dependent variables. To identify students' use of computers for education and entertainment purposes, eleven variables were determined by using a rotated component matrix in factor analysis, as detailed below. These 11 variables about the use of computers for entertainment and educational purposes are shown in Table 1. Three latent variables were generated in order to employ Structural Equation Modeling (SEM) in this study using the dependent and independent variables. The first latent variable has three indicators, including 5 reading scores, which is called READ. The second one has three indicators, including 6 variables about the use of computers for entertainment purposes, which is called ENT. The last one has also three indicators, including 5 variables about the use computers for education purposes, which is called EDU.

Table 1: Variables about the Use of Computers for Different Purposes

(IC4a) Browse the Internet for information about people, things, or ideas[2]
(IC4b) Play games[2]
(IC4c) Write documents[1]
(IC4d) Use the Internet to collaborate with a group or team[2]
(IC4e) Use Spreadsheets[1]
(IC4f) Download software from the Internet (including games)[2]
(IC4g) Drawing, painting or using graphics programs[1]
(IC4h) Use educational software such as Mathematics programs[1]

(IC4i) Download music from the Internet[2]
(IC4j) Writing computer programs[1]
(IC4k) For communication (e.g. Email or "chat rooms")[2]

Notes:
[1]Using computers for education purposes
[2]Using computers for entertainment purposes

Procedures for Data Analysis
Regression analysis is frequently used to examine the relationship between a dependent variable and independent variables. However, in this study, Structural Equation Modeling (SEM) was chosen because SEM enables us to flexibly and powerfully examine the relationships between observed and latent variables, as well as test cross-group similarities and differences among multiple latent variables (Kline, 2010). While the regression approach to modeling does not allow working with latent variables and measurement error, the techniques in SEM make possible taking measurement error into account and working with latent variables when the data is statistically analyzed (Schumacker & Lomax, 2010). Furthermore, it is possible to assess the similarities and differences in means, variances, correlations, and regression relationships among the latent variables by using SEM (Little, 1997).

The PISA data used in study had some issues to be addressed at the outset of the SEM process. Missing data was another problem that had to be addressed. There were approximately 5.8% missing data, 4.8% for females and 7.0% for males. After the SPSS format was saved as LISREL format, the MCMC imputation algorithm was applied to fix missing data in LISREL. After the missing data was imputed, the number of latent constructs for variables about the purposes of computer usage was determined by using a rotated component matrix in factor analysis, as shown in Table-2, in SPSS.

Table 2: Rotated Component Matrix

	Component 1	Component 2
Question-1	0.345	0.609[2]
Question-2	0.205	0.566[2]
Question-3	0.718[1]	0.255
Question-4	0.447	0.591[2]
Question-5	0.784[1]	0.225
Question-6	0.413	0.708[2]
Question-7	0.737[1]	0.248
Question-8	0.718[1]	0.219
Question-9	0.187	0.816[2]
Question-10	0.693[1]	0.281
Question-11	0.145	0.834[2]

Notes:
[1]The using computers for education purpose
[2]The using computers for entertainment purpose

After determining the number of latent constructs, parceling techniques, which offer many advantages to researchers, were applied. Parceling, the average (or sum) of two or more items, responses, or behaviors, is a technique commonly employed and suggested by experts (Little, Cunningham, Shahar, & Widaman, 2002). Parceling has two very important advantages: 1) The sum of many items is more representative than only one item; and 2) aggregating items yields greater precision. Moreover, parceling contributes to reductions in sampling error. The score reliability of parcels (total scores) tends to be greater than that for the individual items (Kline, 2010). There are some techniques to create parcels for each construct. In this study, the balancing technique (unidimentional) and the facet representative parcels technique (multidimentional) were performed by using SPSS 18.0. The number of indicators was decreased by using these two techniques.

The construct ENT, the use of computers for entertainment purpose, had three indicators instead of six indicators, as shown in Table-3.

Table 3: Balancing Technique for Using Computers for Entertainment Purpose

	Q1	Q2	Q4	Q6	Q9	Q11	Q_Total
Q1	1						
Q2	0.308	1					
Q4	0.49	0.336	1				
Q6	0.506	0.399	0.557	1			
Q9	0.452	0.399	0.47	0.615	1		
Q11	0.478	0.376	0.507	0.577	0.635	1	
Q_Total	0.7071	0.6232	0.7503	0.8162	0.7983	0.8011	1

Notes:
[1]Parcel 1 (ENT 1) = Q1&Q11
[2]Parcel 2 (ENT 2) = Q2&Q6
[3]Parcel 3 (ENT 3) = Q4&Q9

The number of indicators for the construct EDU, the use of computer for education purpose, decreased from five to three, as revealed in Table-4.

Table 4: Balancing Technique for Using Computers for Education Purpose

	Q3	Q5	Q7	Q8	Q10	Q_Total
Q3	1					
Q5	0.354	1				
Q7	0.55	0.525	1			
Q8	0.442	0.506	0.479	1		
Q10	0.445	0.521	0.49	0.501	1	
Q Total	0.7511	0.8051	0.7822	0.7532	0.7783	1

Notes:
[1]Parcel 1 (EDU 1) = Q3&Q5
[2]Parcel 2 (EDU 2) = Q7&Q8
[3]Parcel 3 (EDU 3) = Q10

The number of indicators for the construct READ, reading scores, decreased from five to three after being parceled, as indicated in table-5.

Table 5: Balancing Technique for Reading Scores

	R1	R2	R3	R4	R5	R_Total
R1	1					
R2	0.84	1				
R3	0.842	0.834	1			
R4	0.837	0.835	0.834	1		
R5	0.838	0.834	0.842	0.834	1	
R Total	0.9351	0.9211	0.9332	0.9312	0.9323	1

Notes:
[1]Parcel 1 (READ 1) = Q3&Q5
[2]Parcel 2 (READ 2) = Q7&Q8
[3]Parcel 3 (READ 3) = Q10

Each latent variable had three indicators, which included residuals. Structural equation modeling is presented in Figure 1.

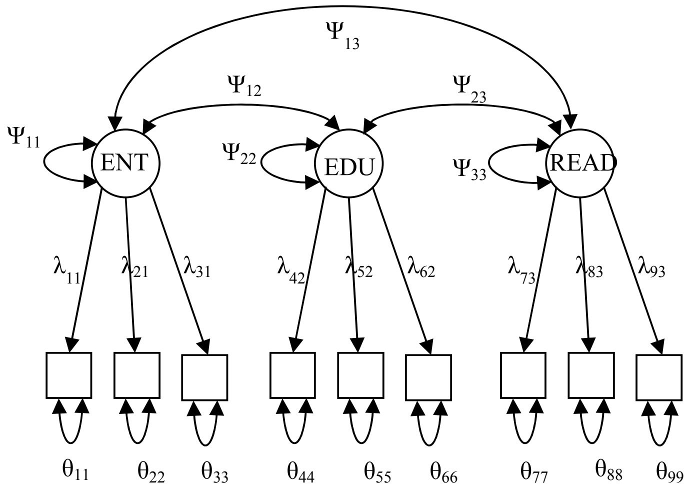


Figure 1: Structural Equation Modeling

Before SEM is built, identification is checked (Kline, 2010). Identification is assuming that the number of parameters is equal to or less than the number of variances and covariances, which is called the number of observations. To illustrate, according to Figure 1, the constructs ENT, EDU, and READ each have 3 indicators. The number of observations is 6 for each construct. The number of parameters for the construct ENT is seven (Ψ_{11}, λ_{11}, λ_{21}, λ_{31}, θ_{11}, θ_{22}, and θ_{33}), for the construct EDU is seven (Ψ_{22}, λ_{42}, λ_{52}, λ_{62}, θ_{44}, θ_{55}, and θ_{66}), and for the construct READ is seven (Ψ_{33}, λ_{73}, λ_{83}, λ_{93}, θ_{77}, θ_{88}, and θ_{99}). All these paths are not identified because the number of observations (6) is less than the number of parameters (7) to be estimated. There are three methods to set the scale and identification: fix factor model, marker variable, and effects coding. The method of scale setting does not affect model fit. Therefore, the fix factor method was used, which revealed that the latent variances were equated to 1.0, and stated that Ψ_{11}, Ψ_{22}, and Ψ_{33} were equated to 1.0 (i.e., sample LISREL syntax VA 1.0 PS (1,1) PS(2,2) PS(3,3,)).

RESULTS

Lisrel 8.8 student version was used in this study. There were three major steps before the regression model was applied, to determine whether the single-group models for females and males were acceptable and appropriate to use confirmatory factor analysis, to establish equivalence of measurement, and to compare the latent parameters across females and males.

The models across females and males

The first two models were single-group models for females and males. Results showed that these two models demonstrated acceptable fit (Female: χ^2 (24, 2290) = 294.4, p=<.001, RMSEA=.071$_{(.060\text{-}.083)}$, NNFI=.97, CFI=.98; Males: χ^2 (24, 2652) = 236.1, p=<.001, RMSEA=.059$_{(.026\text{-}.060)}$, NNFI=.98, CFI=.99). Confirmatory factor analysis (CFA) is presented in Appendix-A for females and Appendix-B for males.

Equivalence of Measurement

The configural invariance model as a first model was applied to determine whether the indicators loaded onto the same constructs across females and males. This model was found as an acceptable fit (χ^2 (48, 4942) = 530.42, p=<.001, RMSEA=.0650$_{(.0601\text{-}.0699)}$, NNFI=.979, CFI=.986). These results showed that the female and male models were identical and could be combined as a single model.

The next step was employing the weak factorial invariance model, which tested if loadings were invariant across females and males. This model demonstrated acceptable fit (χ^2 (54, 4942) = 533.36, p=<.001, RMSEA=.0610$_{(.0565\text{-}.0657)}$, NNFI=.985, CFI=.986). After this model was compared with the configural model, it was found that loadings were invariant across females and males because there was no significant change in fit based on the RMSEA Model Test and the CFI Model Test. The RMSEA values of the weak model fell within the 90% RMSEA confidence interval of the configural model (Little, 1997). The difference of CFI was also less than .01(Cheung & Rensvold, 2002).

Another model was the strong factorial invariance model, which showed that intercepts were invariant across females and males. This model demonstrated acceptable fit (χ^2 (60, 4942) = 799.34, p=<.001, RMSEA=.0719$_{(.0675-.0763)}$, NNFI=.974, CFI=.979). Results showed that intercepts were invariant across females and males after this model was compared to the weak model because there were no significant changes in fit based on the RMSEA Model Test and the CFI Model Test. Means of constructs were also found statistically significant after means of constructs for females fixed to 0.0 (Females: Alpha(ENT)=0*, Alpha(EDU)= 0*, Alpha(READ)=0*; Males: Alpha(ENT)=.63(z=19.8), Alpha(EDU)=.28(z=8.8), Alpha(READ)=-16.8), because the z scores of means of all constructs for males were bigger than 1.96.

Equivalence of measurement was established thus far (i.e., are the same constructs being measured in each group?). Table 6 shows the summary of the level of the invariance.

Table 6: Equivalence of Measurement Summary

Model	χ^2	*Df*	RMSEA	90%CI	NNFI	CFI	ΔCFI	Tenable?
Configural Invariance	530.42	48	0.065	.0601-.0699	0.979	0.986	…	…
Loading Invarince[1]	533.36	54	0.061	.0565-.0657	0.985	0.986	<.001	Yes
Intercept Invariance[1]	799.34	60	0.0719	.0675-.0763	0.974	0.979	0.007	Yes

Note:
[1]Evaluated with the RMSEA Model

Comparing the Latent Parameters
In this process, homogeneity of variance/covariance of latent constructs across females and males was tested. The results showed a significant variance/covariance difference across two groups after comparing this model with the weak model (**Δ**χ^2 (6, n=4942) = 389.91 and p=<.001). The next step was to evaluate whether there was a significant variance difference between females and males. A significant difference was found after comparing this test with the weak test again (**Δ**χ^2 (3, n=4942) = 43.90 and p=<.001). In addition, the equivalence of the correlations among the constructs across females and males was tested by using phantom constructs. The results showed that there was a significant difference in the pattern of correlations among the latent constructs across two groups after comparing this model with weak model (**Δ**χ^2 (3, n=4942) = 94.97 and p=<.001). These steps are shown in Table 7.

Table 7: Comparing Latent Parameters

Model	χ^2	*Df*	*P*	$\Delta\chi^2$	*Δ df*	*P*	Constraint Tenable
Homogenity of Var/Cov[1]	923.266	60	<.001	389.91	6	<.001	No
Equality of Variance[1]	577.256	57	<.001	43.9	3	<.001	No
Equality of Correlations[1]	638.034	57	<.001	94.97	3	<.001	No

Note:
[1]Evaluated with the χ^2 Difference Test Model Test

Three latent constructs, which were identified above, were also evaluated. There were three steps to apply in this process. First, the correlation between the construct EDU and ENT was equated. After comparing this model with the weak model, it was found that the findings were not statistically significant (**Δ**χ^2 (1, n=4942) =.227 and p>.05), which indicated that the correlation between EDU and ENT was not different across females and males. Second, the correlation between the construct EDU and READ was compared to weak model, it was found that the result was statistically significant (**Δ**χ^2 (1, n=4942) =79.05 and p=<.001), which demonstrated that the correlation between EDU and READ was different across females and males. Last, the correlation between the construct ENT and READ was compared with the weak model, the result was not statistically significant (**Δ**χ^2 (1, n=4942) =.060 and p>.05). That is the correlation between ENT and READ was not different across females and males.Table-8 presents equality of correlations across the latent variables for females and males.

Table 8: Equality of Correlations across latent parameters

Model	χ^2	*Df*	*P*	$\Delta\chi^2$	*Δ df*	*P*	Constraint Tenable
EDU- ENT[1]	533.562	55	<.001	0.227	1	>.05	Yes
EDU- READ[1]	612.36	55	<.001	79.05	1	<.001	No
ENT- READ[1]	533.395	55	<.001	0.06	1	>.05	Yes

Note:
[1]Evaluated with the χ^2 Difference Test Model Test

Regression
The last part of this analysis was to determine if the use of computers for different purposes affected the students' reading scores across two groups, which meant asking if there was any difference between females and males for ENT and EDU to predict READ. The results of regression analysis showed that for females (R^2=.09), ENT affected READ positively (β_1=.370) while EDU affected READ negatively (-.491) as seen in Appendix-C. The findings for males were similar to the findings for females. It was found that ENT affected READ positively (β_1=.379) while EDU affected READ negatively (-.507), as seen in Appendix-D (R^2=.10). In conclusion, while the use of computers for entertainment purposes affected reading scores positively, the use of computers for education purposes affected reading scores negatively across both females and males. However, without equating each part of the model, whether regression coefficients for females and males were statistically significant could not be determined. Before equating regression coefficients for ENT and EDU, regression models for females and males were applied in the same model (χ^2 (54, 4942) = 533.335, p=<.001, RMSEA=.0610$_{(.0565\text{-}.0657)}$, NNFI=.982, CFI=.986). Then, regression coefficients for ENT were equated across females and males. Once this model was compared with the previous model, the findings showed that the regression coefficient for ENT was not different across females and males ($\Delta\chi^2$ (1, n=4942) =.018 and p=<.001). The same process was applied for EDU, and it was found that the regression coefficient for EDU also was not different across females and males ($\Delta\chi^2$ (1, n=4942) =.056 and p=<.001**).** These steps are shown in Table 9.

Table 9: Equality of Regression Coefficients across females and males

Model	χ^2	*Df*	*P*	$\Delta\chi^2$	*Δ df*	*P*
Configural Model	533.34	54	<.001	…	…	…
Equality of ENT[1]	533.35	55	<.001	0.018	1	>.05
Equality of EDU[1]	533.39	55	<.001	0.056	1	>.05

Note:
[1]Evaluated with the χ^2 Difference Test Model Test, based on configural model

CONCLUSION
The purpose of this study was to find out how the use of computers for entertainment and education purposes influences students' reading performance across females and males. With this aim, the relationship between Turkish students' reading scores in PISA 2006 and their purposes of computer use was examined. Structural Equation Modeling (SEM) was used for the analysis because SEM enabled us to apply the regression model in this study. Furthermore, SEM made possible exploring the relationship among latent constructs across two groups, females and males. Regression Analysis was applied to predict reading scores by the use of computers for entertainment and for education purposes across females and males. The findings show that while the use of computers for education purposes influenced students' reading scores negatively, the use of computers for entertainment purpose affected reading scores positively across both gender. These findings are consistent with the findings of two previous studies (Ziya, Dogan, & Kelecioglu, 2010; Erbas, 2005), which respectively investigated the relationship between Turkish students' mathematics and science performance in PISA and their purpose of using computers.

In general, our findings suggest that students who use computers to perform more advanced tasks show less achievement in reading. At this point, one could argue that these students devote too much time to learn and perform these advanced tasks on computers, and this process may prevent them for reserving enough time for doing their homework and reading different materials. On the other hand, using computers for entertainment purpose may reduce students' stress, increase their motivation, and enable them to study more efficiently. Furthermore, students who use computers for gaming, chatting with friends, or surfing on the internet may unintentionally develop their reading skills. These entertainment activities may also enable students to read in detail and think critically, which are necessary for understanding the context of a reading. However, this study does not, and did not intend to, fully explain the casual relationship between using computers for entertainment purposes and students' performance in reading. Hence, it is very important for further researchers to explore this issue. In the future, our focus will be how the use of computers for different purposes affects students' self-motivation and the learning of different school subjects.

There are also some limitations in this study. First, the findings of this study cannot be generalized to other countries since the sample of this study only included 15-year-old students from Turkish high and middle schools. Second, PISA 2006 included a limited number of questions concerning students' purposes of computer use. Hence, the number of independent variables in this study might not be sufficient to show the relationship between the use of computers for different purposes and reading scores. Despite these limitations, the sample size was adequate (n=4952) for employing SEM in this study, and by using the flexible SEM framework, the process of exploring the interrelationships between students' gender, purposes of computer use and their reading skills has begun.

REFERENCES

Aksit, N. (2007). Educational reform in Turkey. *International Journal of Educational Development 27*(2), 129-137.

Alacaci, C. & Erbas A.K. (2010). Unpacking the inequality among Turkish Schools: Finding from PISA 2006. *International Journal of Educational Development, 30* (2)*,* 182-192.

Anil, D. (2009). Factors Effecting Science Achievement of Science Students in Programme for International Students' Achievement (PISA) in Turkey. *Education and Science, 34* (152), 87-100.

Altun, A. (2007). *Effects of student and school related factors on the mathematics achievement in Turkey at eight grade level*. Unpublished master thesis. Ankara: Middle East Technical University.

Aypay, A. (2010). Information and Communication Technology (ICT) Usage and Achievement of Turkish Students in PISA 2006. *The Turkish Online Journal of Educational Technology-TOJET, 9* (2), 116-124.

Cheung, G. W. & Rensvold, R. B. (2002).Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9* (2), 233-255.

Chiu, M. & McBride-Chang, C. (2006). Gender, Context, and Reading: A comparison of students in 43 countries*. Scientific Studies of Reading, 10* (4), 331-362.

Çifçi, A. (2006). *Acoording to mathematics subtest results of PISA 2003 investigation of some factors' effect on student achievement in Turkey.* Unpublished master thesis. Ankara: Hacettepe University.

Demir, I., Kilic, S., & Unal, H. (2010). Effects of students' and schools' characteristics on mathematics achievement: findings from PISA 2006. *Procedia Social and Behavioral Sciences, 2* (2)*,* 3099–3103

Duman, A. (2006). *Evaulation of the factors which effect on mathematics achievement of primary school students for students and teachers (Eskişehir sample).* Unpublished master thesis. Eskişehir: Osmangazi University.

Durndell, A. & Zsolt H. (2002). Computer Self-Efficacy, Computer Anxiety, Attitudes Toward the Internet and Reported Experience with the Internet, by Gender, in an East European Sample. *Computers in Human Behavior,18* (5), 521–35.

Erbas, K. C. (2005). *Factors affecting scientific literacy of students in Turkey in Programme for International Student Assessment (PISA).* Unpublished doctoral dissertation. Middle East Technical University, Ankara, Turkey.

Ham, S. H. & Cha. Y. K. (2009). Positioning Education in the Information Society: The Transnational Diffusion of the Information and Communication Technology Curriculum. *Comparative Education Review, 53* (4), 535-557.

Kline, R. B. (2010). *Principles and practice of structural equation modeling*. New York: Guilford Press.

Lily, S. (1994). Gender-Differences in Computer Experience and its Influence on Computer Attitudes. Journal *of Educational Computing Research, 11* (4), 347-367.

Little, T. D. (1997). Mean and covariance structures (MACS) analyses of cross-cultural data: Practical and theoretical issues. *Multivariate Behavioral Research, 32* (5), 53-76.

Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling, 9* (2), 151-173.

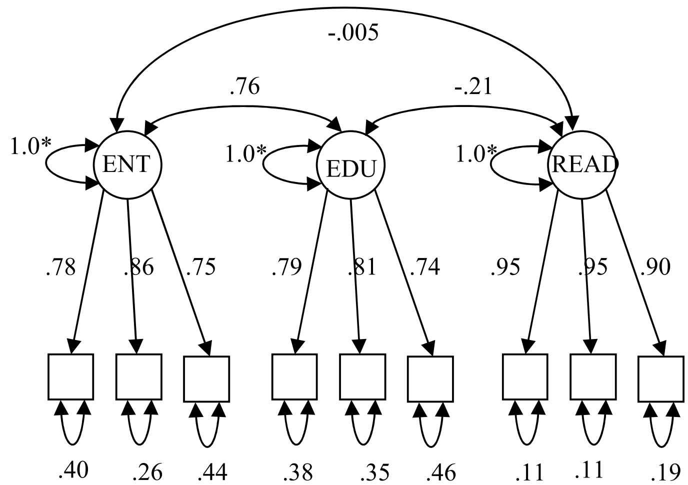
Logan, S. & Johnston, R. (2010).Investigating Gender Differences in Reading. *Educational Review; 62* (2), 175-187.

Luan, W.S., Fung, N. S., Nawawi, M., & Hong, T. S. (2005). Experienced and inexperienced internet users among pre-Service teachers: Their use and attitudes toward the Internet. *Educational Technology & Society, 8* (1), 90-103

Ministry of National Education (MONE). (2005). *Basic Education in Turkey background report*. Ankara, Turkey. Organization for Economic Co-operation and Development (OECD), 2006. *Assessing scientific, reading and mathematical literacy: A Framework for PISA 2006*. OECD, Paris.

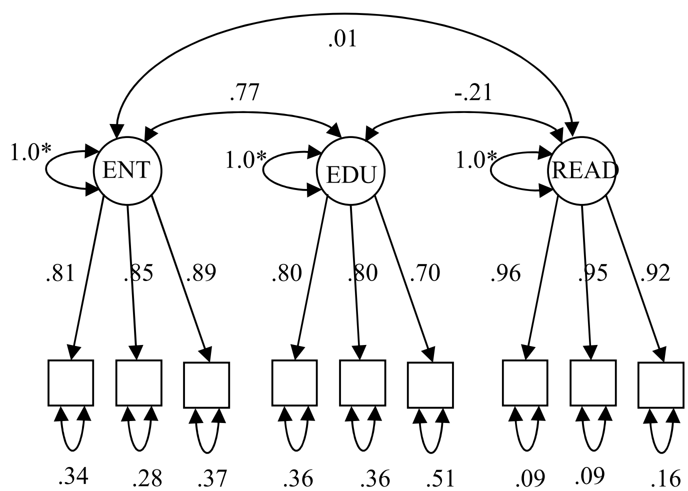
Unal, H. & Demir, I. (2009). Divergent thinking and mathematics achievement in Turkey: Findings from the programme for international student achievement (PISA-2003). *Procedia Social and Behavioral Sciences, 1*(1)*,* 1767-1770.
Roberts, D.H. (1995). The role of universities in industrial innovation and technology transfer. *Industry and Higher Education, 9* (3), 149-156.
Sharma, P. & Maleyeff, J. (2003). Internet education: potential problems and solutions. *The International Journal of Educational Management*, *17* (1), 19-25.
Schumacker, R. E. & Lomax, R.C. (2010). *A Beginner's Guide to Stuructural Equation Modeling.* New York: Routledge.
Yılmaz, E. T. (2006). *The factors which effect on mathematics achievement of Turkish students in PISA 2003.*Unpublished master thesis. Ankara: Hacettepe University.
Ziya, E., Dogan, N., & Kelecioglu, H. (2010). What Is the Predicted Level of Which Computer Using Skills Measured in PISA for Achievement in Mathematics. *The Turkish Online Journal of Educational Technology-TOJET, 9* (4), 185-191.

Appendix A: Confirmatory Factor Analysis for Females



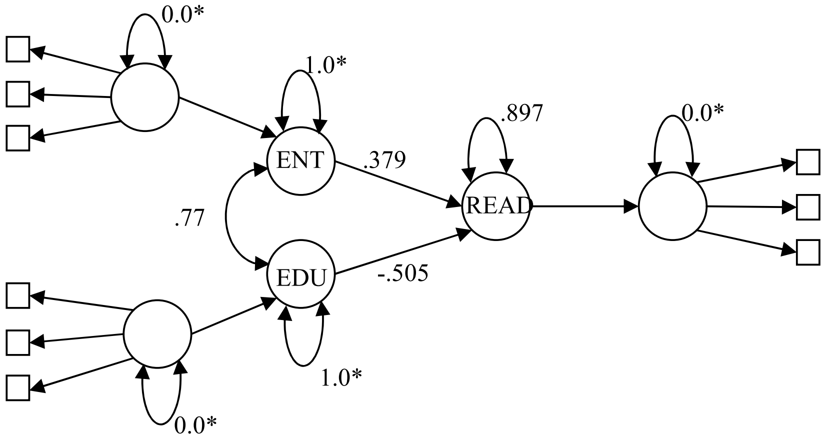
$\chi^2_{(24,\ 2290)} = 294.4$ RMSEA=0.071$_{(.060\text{-}.083)}$ CFI=.98 NNFI=.97

Appendix B: Confirmatory Factor Analysis for Males



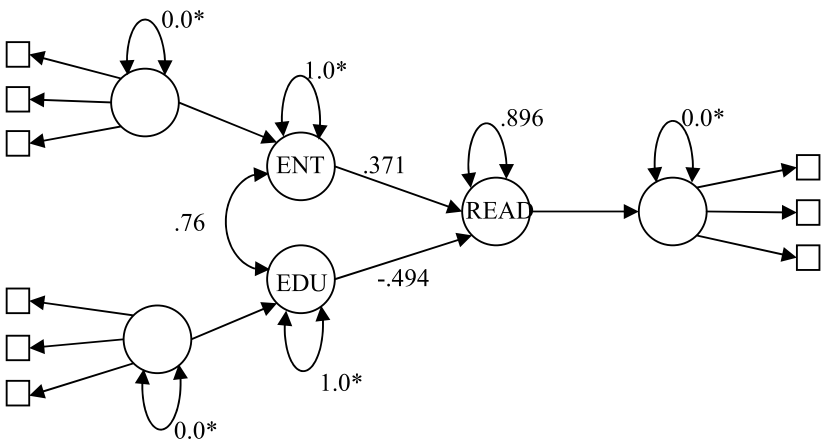
$\chi^2_{(24,\ 2652)} = 236.1$ RMSEA=0.059$_{(.026\text{-}.060)}$ CFI=.99 NNFI=.98

Appendix C: Confirmatory Factor Analysis of regression model for females



$\chi^2_{(24,\ 2290)} = 295.3$ RMSEA=0.071$_{(.064\text{-}.078)}$ CFI=.98 NNFI=.97

Appendix D. Confirmatory Factor Analysis of regression model for Males



$\chi^2_{(24,\ 2652)} = 233.5$ RMSEA=0.071$_{(.052\text{-}.066)}$ CFI=.99 NNFI=.98

ICT AND AN EXPLORATORY PEDAGOGY FOR CLASSROOM-BASED CHINESE LANGUAGE LEARNING

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ABSTRACT
This paper reports on a new pedagogy for Chinese language teaching and learning at elementary schools through exploratory classroom instruction using Information and Communication Technologies. The study used quantitative method to collect data from two elementary schools of China. The results showed that:(1) the three-in-one pedagogy of "character recognition, in-class reading and in-class writing" is a new approach for enhancing the efficiency of Chinese language learning at elementary schools, and (2) the new pedagogy provides a new perspective of integrating ICT into Classroom-based Chinese Language Learning (CCLL).
Keywords: Pedagogical issues, Improving classroom teaching, Media in education, Teaching/learning strategies, Elementary education

INTRODUCTION

The rapid development of ICT and its wide application have profound influence on education. This influence does not merely manifest in the changes in instructional tools, but more importantly in in-depth revolution in educational thoughts, instructional ideas, learning contents, and teaching methods (He & Ma, 2005). A learning society requires its citizens to have solid knowledge of humanity and science, to be innovative, collaborative and open minded, to have good communication skills and the abilities to search and process information using modern technologies (Ministry of Education of PRC, 2002). Therefore, the teaching and learning of language should play and is playing "double" roles: an advocator and explorer of e-learning transformation, and a foundation-layer and practitioner of life-long learning. An inadequate mastery of its own language will create a dysfunctional society (Ye, 1959). Language is one of the most important communicative tools and is a crucial component of culture. Learning language is also learning to be oneself. Along with the training of reading, writing, listening and speaking, come cognitive education, emotional education and personality-building. Language is more than a system of symbols, but a system of meaning and values through which a nation comes to the understanding of itself and the world. Language is firmly connected with the deep culture of the nation (Yu, 1998). Teaching and learning of language in elementary schools is therefore a significance task. The acquisition of literacy, characters recognition, reading, writing and oral ability, as well as the cultivation of good morals and habits, are all closely related to the teaching and learning of language.

However, Classroom-based Chinese Language Learning (CCLL) faces some challenges in efficiency such as teacher-centered instruction(He, 2002; Li, 1998; Lü, 1987; Peng, 2008; Yu, 1998), inappropriate use of ICT(Peng, 2008), and negligence on the development of pupils' intelligence(He, 2000; Lin, 2007). In this study, we will attempt to seek an approach to meet challenges to enhancing efficiency of Chinese language learning.

AN OVERVIEW OF RELATED RESEARCH

A review of literature in China reveals four trends in an area of Chinese language learning: basic framework trend, decomposition of basic ability trend, integrated ability trend, and trans-disciplinary trend.

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The basic framework trend includes the ability-featured framework and teaching-featured framework. Research on the ability-featured framework asserts that CCLL should consist of four components: reading, speaking, character recognition, and writing (Li, 1930). Yao (2001) holds the viewpoint that pupils' speaking and character application abilities need to be trained in six aspects: character recognition, character writing, passage writing, editing hand-written newspaper, oral reading, and story-telling . Research on teaching-featured framework describes CCLL in four aspects: teachers' responsibility, pupils' learning achievements, curriculum and the process of intensive reading, and holds the belief that there should be different layers and hierarchies of contents and depths in different grades (Wang, 1929). This basic framework trend enables the shaping of theoretical system of CCLL (Wu, 2000).

The trend of decomposition of basic ability mainly focuses on reading ability and gradually divides into different schools of reading teaching and learning. After the founding of the PRC, large-scale discussions and experiments were conducted for the first time in the area of CCLL and "red-scarf" school was one of the results of these experiments (Ye, 1953). "Red-scarf" school advocates that teachers innovate and seek the right way to improve the quality of CCLL" (Zhang, 1954) as against the conventional spoon-feeding way of explaining word by word. This gives new insights and impetus to CCLL reform (Zhang, 2006). Leading reading school advocates that pupils are free to learn the texts under the teachers' guidance, and finally learn to read by themselves (Hong, 1984). Menglong Qian school puts forward three basic reading models of independent reading, guided reading and repeated reading (Dou, 2003).

The trend of integrated ability emphasizes that reading instruction and writing instruction should be combined. The central mission is the development of language and thinking abilities. By plenty of reading and writing, pupils' abilities are built step by step into a solid foundation for learning in future (Ding, 2003).

The trans-disciplinary trend takes the angle of psychological research. It shifts the CCLL from external influence factors to internal cognitive principles. Yuan (1936) had attempted to introduce the psychological aspect into the instruction of reading during his time, and had brought forward the "full-text pedagogy" aiming at grasping the whole meaning of passages. Li (2007) advocates her situation pedagogy with "truth, beauty, emotion and thought" as its characteristics based on artistic conception theory.

In summary, the general claims have been that all about trends regard character recognition, reading and writing as a separate pedagogy in pupils' Chinese language learning. However, they don't still devote to effectively solve the problems of "slow in language acquisition" (Lü, 1987) and in-depth integration of ICT into CCLL(He, 2006). The long existence of these problems is the fundamental reason that why CCLL is unsatisfactory in learning efficiency. In this study, we will attempt to integrate ICT into CCLL and connect character recognition, reading with writing so that form a whole, student-centered approach to enhancing efficiency of Chinese language learning.

RESEARCH QUESTIONS

Learning efficiency, as the name suggests, is one of standards in learning language concerned about relationship between learning time and learning performance according to curriculum required(He & Ma, 2005). The high learning efficiency means less learning time resulting in high learning performance. According to this definition, learning efficiency has two features: "less time" and "high learning performance". In terms of curriculum required, learning periods consist of the first period(grade one to grade two), the second period(grade three to grade four), the third period(grade five to grade six) and the fourth period(grade seven to grade nine) (Ministry of Education of PRC, 2002). For Chinese language learning, less time indicates a "jump" that learners complete the higher goal required by curriculum in lower period and high learning performance puts emphasis on the number of character recognition, reading and writing in every learning period. In this study, we focus on learners' "jump" that happens from the first period to the second period and learners' high performance indicated by the number of character recognition, reading and writing in the first period.

The research aims to seek a new e-learning approach to enhancing learning efficiency at elementary school through exploratory classroom-based instruction. We used quasi-experiments to address the problems mentioned above. The following questions guided this research:

- Is there a new approach for enhancing effiency of learning in CCLL?
- What influence does the approach have on the integration of ICT into CCLL?

RESEARCH DESIGN

In this study, we design basic structure to support "three-in-one" pedagogy. The figure 1 shows the research structure that consists of (a)learning environment preparation;(b) Lesson Design;(c) Design of time allocation in the instructional process;(d) Design of instructional flow map;(e) Design the strategies of ICT use; (f) Design of in-class extensive reading materials, and (g) Design of in-class oral expression or writing situation.

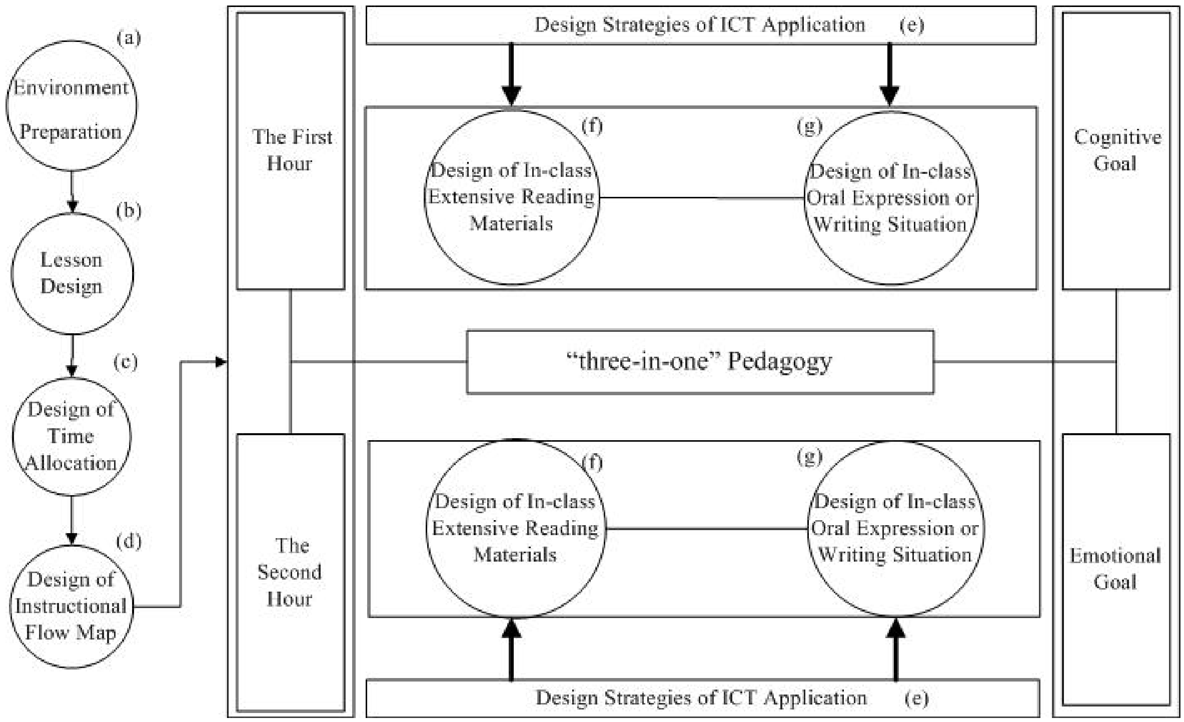


Figure 1. The Structure of Research Design

Learning Environment Preparation

Learning environment consists of hardware environment and programs use.The hardware environment includes a computer connected to multimedia device already available in the schools, such as rear projection TV or overhead projector. Programs such as MS Word, PowerPoint and FrontPage were used frequently for writing instructional designing plan, courseware, and for creating simple web pages.

Lesson Design

The textbook used in the experiment was the standard textbook for compulsory education curriculum published by People's Education Press. The subjects of the experiment were primary school pupils in Grades 1 and 2. The Lesson in lower grades was divided into two categories based on content: pinyin-dominated and text-dominated lesson type (pinyin: the Chinese phonetic symbol). Pinyin-dominated lesson was for the pupils to master "pinyin" to facilitate study in character and reading. Pinyin-dominated lesson take up only 6 to 8 weeks of whole curriculum time. Pupils in the experiment were required to learn 4 units (13 lessons in total) of pinyin-dominated lessons as well as 28 units (120 lessons in total) of text-dominated lessons. The whole process lasts 80 weeks.

Design of Time Allocation in the Instructional Process

In China, a single Chinese lesson for primary pupils is usually 40 minutes. In conventional CCLL lessons that follow the "10:0" rule, the whole instructional time of 40 minutes are monopolized by teachers in all lessons. In our experiment, we changed the time allocation to "5:5", meaning that 20 minutes are allocated for teacher's instruction, and the other 20 minutes are for pupils' independent learning. This "independent learning" was again divided into two stages: 10-minute for extended reading and 10-minute for oral expression or writing.

Design of Instructional Flow Map

Instructional flow map illustrates the steps to follow when teachers conduct instruction in an ICT-supported environment. The design of instructional flow maps is based on principles and requirements of different lesson types(Zhao, 2007). We designed both the pinyin-dominated and text-dominated lessons, in two-hour blocks each, according to the time allocation rule mentioned above. The first hour was for cognitive goals that were mainly about character recognition and the second hour of the block was mainly for emotional goals that were mainly for understanding of the texts. The following four figures show the lesson flows in detail.

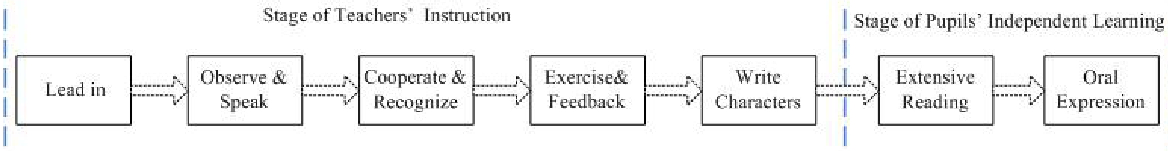


Figure 2. First Hour for Pinyin-dominated Lesson Type

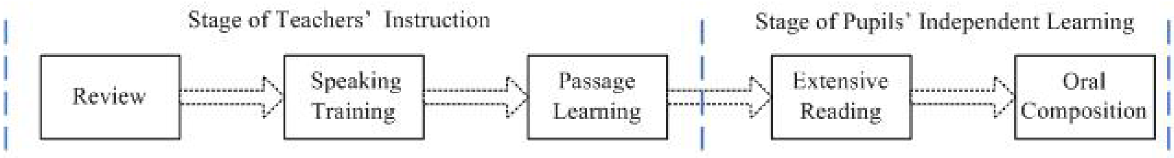


Figure 3. Second Hour for Pinyin-dominated Lesson Type

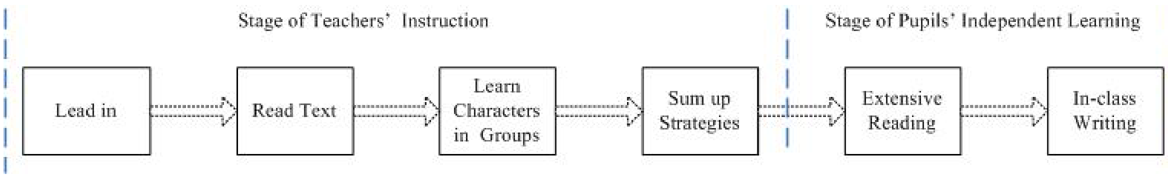


Figure 4. First Hour for Text-dominated Lesson Type

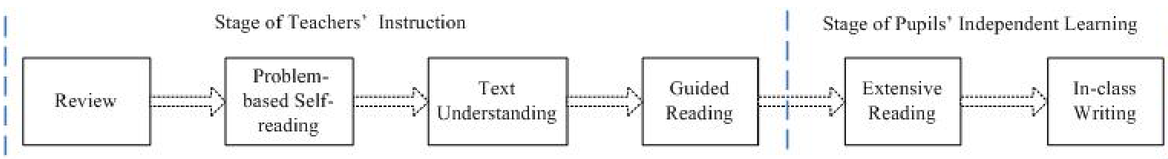


Figure 5. Second Hour for Text-dominated Lesson Type

Design the Strategies of ICT Use

Integration of technology into classroom is inevitable nowadays(Çakir, 2006).There can be different ways of integrating ICT into CCLL. Nevertheless, the successful application of technology always depend on factors such as the contents of different lesson types, instructional goals and instructional process, learners' original cognitive basis, learners' learning situation, etc. When designing instructional experiments, we did not take ICT as the main concern of the whole instructional process, nor did we specifically regulate that what instructional segments ICT must or should support. We provided 8 strategies by which ICT could enhance instructional efficiency and have the teachers choose them according to the actual instructional settings.

- ICT for situation creation. Situation can be created by displaying photos and music, role-playing and so on. Pupils placed in the right emotional experience would better comprehend the artistic conception described in the text and thus their imagination and situational thinking can be fostered (Li, 2007).
- ICT to support oral expression. By displaying pictures, pupils could observe people, event and circumstances, and orally express them in certain order such as when, where, who, what happened. Pupils could also associate the pictures with their life experiences, and talk about what they can imagine. This way of oral expression is called "oral composition" in CCLL.
- ICT to demonstrate good reading. The reading demonstrations are usually done by reputed anchormen or announcers. Their reading not only make pupils appreciate the pronunciation of standard Putonghua, but also create resonance in pupils to stimulate deeper understanding of the text as well as thoughts and emotion of the author.
- ICT to display the stroke order of Chinese characters. This is one of the basic requirements in character writing. It is hard for a teacher without vigorous training to master character writing in "Tian Zi Ge". By using ICT, pupils could not only get a clear view of the components and structure of the characters, but also understand the correct order of the strokes when writing the characters. ICT also enables pupils to repeatedly observe and imitate the writing process.

Design of In-class Extensive Reading Materials

It is critical to use materials to build new knowledge in the process of instructional design(Isman, 2010). So in-class extensive reading materials are used to help student contruct new knowledge in this study. In-class extensive reading materials are mainly auxiliary printed materials prepared to support the 10-minute extended reading time allocated for pupils' independent learning period. In the 10 minutes allocated, pupils read independently the materials provided while teachers give individual attention to those with reading difficulties. Teachers are to ensure that pupils have sufficient time to engage in uninterrupted reading.

In preparation for the experiment, we designed 3 to 8 such reading materials for each of the hours. Teachers were given the freedom to decide the actual number of passages to be used based on instructional goals and pupils' learning conditions. Extensive reading materials for Grade 1 were annotated pinyin while pinyin was given only for new characters for Grade 2 materials. The selection of materials is based on the four criteria (He, 2007):

- The materials should be closely related to the contents and topics.
- The materials should be similar in text types and forms.
- The materials should be suitable for pupils' cognitive development.
- The materials should be interesting enough and foster intellectual development.

Table 1 shows the example of extended reading material designed for "balloons in front of the window" (from Unit Six, Book Three, Grade Two)

Table 1 Design of Pupils' In-class Extensive Reading Materials for Each of the Hours

	The First Hour	The Second Hour
Instructional Goals	Pupils are able to write the 8 new characters and recognizing and another 9 new characters in the text	Pupils are able to understand the content of the text and comprehend the love between friends
Titles of In-class Extensive Reading Materials	（1）Keliya in Sickroom （2）Sports Meeting （3）What is Carried in the Car	（1）Teacher in Hospital （2）Lunch （3）The Girl in Wheelchair （4）Sing for You （5）The Little Bear Taking Pleasure in Helping （6）A Visitor （7）Straw-crow and Cat （8）A Monkey Sells Umbrella
Instructions	These 3 passages contain the 9 new characters including "科" that pupils should be able to recognize as stated in the instructional goals and the 8 new characters including "床" that pupils should be able to write. This could help pupils to memorize and apply new characters in different language settings	All 8 passages tell stories about the caring love between friends or between teachers and students. By reading them, pupils would have a deeper understanding about the caring love between Keliya, the leading character of the story, and his friends

Design of In-class Oral Expression or Writing Situation

In-class oral expression or writing situation is the cue material presented in the form of pictures and passages. These materials are used to support 10-minute in-class oral expression or writing time allocated for pupils' independent learning period. In the 10 minutes allocated, teachers create an oral expression or writing situation based on the subject matter of the text and instructs pupils to write compositions on their own while teachers pay attention to individual pupils with writing difficulties. Compositions could be long or short, with no specific requirement. Pupils could either imitate or continue with others' works or start their own creation.

In preparation for the experiment, we designed in-class oral expression or writing situation for the each of the hours. The first hour is mainly for flexible application of new characters and phrases while the second is for in-depth reflection upon the subject matter. Our design takes into consideration the following three basic principles (Ye, 1959; Zhao, 2007; He, 2007):

- Describing at least two situations for pupils at different levels to choose from.
- Situation described should be related to pupils' life.
- Situation description cannot stray from the instructional goal of the lesson.

Again we take "balloons in front of the window" (from Unit Six, Book Three, and Grade Two) as example. The situations designed for the first and second hour are as follows:

Situation designed for the first hour:

Keliya lies quietly in a sick bed looking out of the window in a daze. What is he thinking about? His pals? His teachers? Some happy moments? If you were Keliya, what would you be thinking about? Pick up your pen and write it down. You are encouraged to use new characters you have just learnt today.

Situation designed for the second hour:
Ever since Keliya saw the balloons in front of the windows, he felt that he was no longer alone because his pals never forgot him. Every time he felt lonely or sad, he would recall the red balloons flying over the window. Everyday, he cooperates with the doctors, hoping to get back to his friends. Finally, he recovered and left the hospital in a sunny morning. What feeling would Keliya have when he knew that he could leave the hospital? What would happen next?

RESEARCH METHODS

Participants

Participants are recruited from two primary schools in Fengning Manzu Nationality Autonomous County, Hebei Province. It is a national-level impoverished county, and is among the first experimental counties of Modern Distance Education Project for Rural Schools (MDEPRS) organized by Ministry of Education of China. 42 students was from Class 1, Grade 2 in Fengning No. 3 Primary School, the sample includes 23 girls and 19 boys, the mean age is 7.0 years(SD=0.000); 45 students was from Class 4, Grade 2 in Fengning No. 1 Primary School, the sample includes 27 girls and 18 boys, the mean age is 7.089 years(SD=0.596).

Data Collection

Quantitative research method is employed in this experiment.

In data collection for characters recognition, "One to one" testing method is used. The test was administered by pupils from higher grades (generally in Grade 5 or 6) in a one-to-one question-answer sessions(He & Ma, 2005). the characters used in the test were selected from the textbook 1 to 12 for compulsory education curriculum, published by People's Education Press. Totally 3132 characters were tested. As to multiple pronunciation characters, pupils who get one pronunciation right could be considered as correct.

About test of efficiency enhancement of reading, exam papers are used.

The reading scores test was designed to test reading speed, comprehension, and understanding of the emotion expressed. The test paper consists of 5 passages, 250 to 350 characters in length, of different genre from outside sources and the test level is equal to the level required by curriculum standards in the second period. For assessing reliability for exam paper, the Cronbach's alpha coefficient is adopted. The alpha coefficient is alpha= 0.6758(N=43). The total score is 40 and the lowest score is 24(60% of total score, sometimes even 70%) that required by curriculum standards to pass. Within 45 minute, each pupil was to read independently and answer the given questions which included fill in the blanks, multiple choice and short answers.

on-the-spot composition are used in this study.Teachers project the title or situation description of the composition assigned onto the big screen and explained briefly before pupils commence. The title and situation description for writing score test was decided by the researcher with content and level of difficulty pegged to the standard instructional goal. Time given for writing was 30 minutes. The topic for the test was "A Water Drop Journey". The level is equal to the level required by curriculum standards in the second period. For assessing reliability for exam paper, the Cronbach's alpha coefficient is adopted. The alpha coefficient is alpha= 0.9010(N=43).The total score is 30 and the lowest score is 18(60% of total score, sometimes even 70%) that required by curriculum standards to pass.

RESULTS

Efficiency Enhancement on Chinese Character Recognition Score

According to the curriculum standards, pupils in the first period(from Grade one to Grade two) are to recognize only 1600-1800 frequently used characters (Ministry of Education of PRC, 2002). Table 2 shows that pupils' average number of character recognition is about 2942.67 and 2867.70 respectively, which has exceeded 1800 as stated in the curriculum standards. Of the two experimental classes, the minimum of character recognition also exceeds 1800.

Standards for Grade three to Grade four was 2500 frequently used characters (Ministry of Education of PRC, 2002). Table 2 shows that the average number of character recognition for every experimental class exceeds 2500. The percentage of pupils that the number of character recognition is more than 2500 have been reached 95.2% and 93.5% respectively.

According to the curriculum standards, we used one-sample t-test to compare mean differents and used "1800" and "2500" as two test value. There has been a significant different no mattter which test value is used(see table 3). This indicates that the number of of character recognition in the first period has reached the goal that required by the curriculum standards in the second period.

Table 2 Number of Chinese Character Recognition about Experimental Classes at the end of Grade 2

No. [a]	N	Fewer than 2500		2500~3000		More than 3000		Minimum	Mean	Std.Error
		N	%	N	%	N	%			
1	42	2	4.76%	16	38.10%	24	57.14%	2193	2942.67	30.19
2	45	3	6.67%	26	57.78%	16	35.56%	2007	2863.44	34.66

Note. [a] 1: Class 1, Grade 2, Fengning No. 3 Primary School;2: Class 4, Grade 2, Fengning No. 1 Primary School.

Table 3 The One Sample T-test of Number of Chinese Character Recognition about Experimental Classes at the end of Grade 2

No. [a]	N	Test value=1800			Test value=2500		
		t	df	p	t	df	p
1	42	38.845	41	0.000	14.661	41	0.000
2	45	30.686	44	0.000	10.487	44	0.000

Note. [a] 1: Class 1, Grade 2, Fengning No. 3 Primary School;2: Class 4, Grade 2, Fengning No. 1 Primary School.

Efficiency Enhancement on In-class Reading Scores

We have conducted statistical analysis of the number of characters for the 10-minute in-class extending reading materials. By reading 10 minutes each lesson, pupils have read over 550,000 characters from grade one to grade two. However, in the curriculum standards of Chinese language for the first learning period (Grade one to Grade two), the requirement for extra-curriculum reading only is "no less than 50,000 characters", and the requirement for the second learning period (Grade three to Grade four) is "no less than 40,000 characters".

According to the curriculum standards, we used one-sample t-test to compare mean differents and used "24" and "28" as two test value. Table 4 shows that there has been a significant different no mattter which test value is used.This indicates that the scores of reading in the first period have reached the goal that required by the curriculum standards in the second period.

Table 4 The One Sample T-test of Scores of Reading about Experimental Classes at the end of Grade 2

No. [a]	N	Test value=24				Test value=28			
		t	df	p	Mean	t	df	p	Mean
1	42	11.198	41	0.000	32.56	5.965	41	0.000	32.56
2	45	15.347	44	0.000	34.13	9.289	44	0.000	34.13

Note. [a] 1: Class 1, Grade 2, Fengning No. 3 Primary School;2: Class 4, Grade 2, Fengning No. 1 Primary School.

Efficiency Enhancement on In-class writing Scores

As is shown in table 5, the average number of characters in pupils' writing for every experimental class was 300 and 278 respectively. The maximum of characters is 537 and the least number of characters is 166. According to the curriculum standards, we used one-sample t-test to compare mean differents and used "18" and "21" as two test value. Table 6 shows that there has been a significant different no mattter which test value is used.This indicates that the scores of writing in the first period have reached the goal that required by the curriculum standards in the second period.

As for the quality of the content, the curriculum standards(Ministry of Education of PRC, 2002) for Grade one and grade two require pupils "to write what you want to say, write what you imagine, and your feelings and impressions about your surroundings"(p.6), whereas for Grades three and four, the requirement is "to write your feelings and imaginations as well as what your have seen and heard free without constraint, with special attention on what makes you feel strange, impressed or deeply moved" (p.8). The researcher found that the writing ability of those pupils in the experimental classes has exceeded the requirement for Grades one and two and almost reached the requirement for Grades three and four.

Table 5 30-minute Writing Test Data about Experimental Classes at the end of Grade 2

Primary School [a]	Class name	N	Minimum	Maximum	Mean
1	Class 1 Grade 2	42	220	400	300
2	Class 4 Grade 2	45	166	537	278

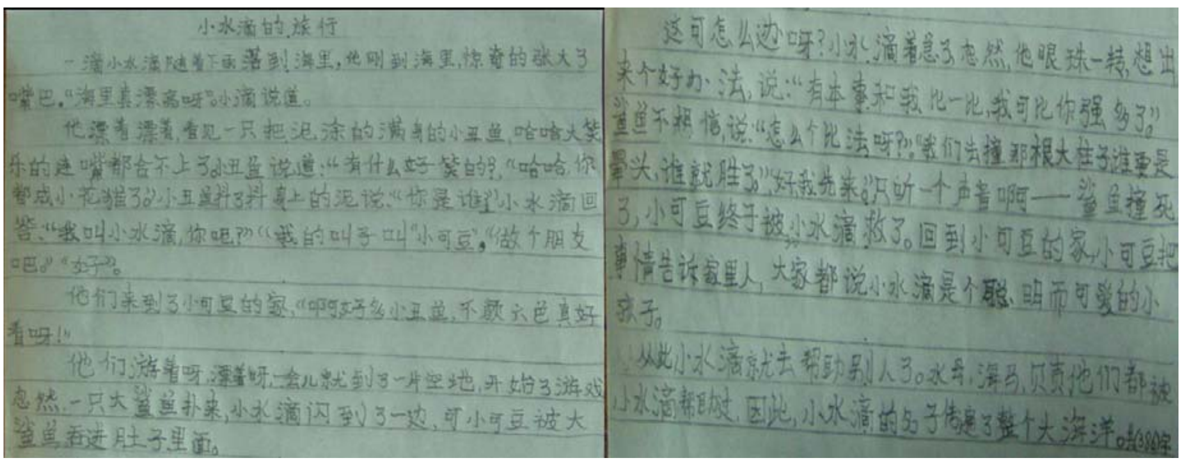
Note. [a] 1: Class 1, Grade 2, Fengning No. 3 Primary School;2: Class 4, Grade 2, Fengning No. 1 Primary School.

Table 6 The One Sample T-test of Scores of Writing about Experimental Classes at the end of Grade 2

No. [a]	N	Test value=18				Test value=21			
		t	df	p	Mean	t	df	p	Mean
1	42	7.333	41	0.000	22.07	1.930	41	0.061	22.07
2	45	12.411	44	0.000	25.73	7.596	44	0.000	25.73

Note. [a] 1: Class 1, Grade 2, Fengning No. 3 Primary School;2: Class 4, Grade 2, Fengning No. 1 Primary School.

By the passage below, we can see that the pupil was able to bring her imagination into full play, compared the water droplet to a child capable of solving problems and remaining calm when faced with danger. The short passage did not limit itself to the journey of a water droplet, instead it extended into a lesson to educate and enlighten fellow peers. Meanwhile, the writer used such words as "眼珠一转" to illustrate the cleverness of the water droplet, which made the passage especially vivid and interesting.


小水滴的旅行

一滴小水滴随着下雨落到海里，他刚到海里，惊奇的张大了嘴巴，"海里真漂亮呀"小滴说道。

他漂着漂着，看见一只把泥涂的满身的小丑鱼，哈哈大笑，乐的连嘴都合不上了。小丑鱼说道："有什么好笑的？""哈哈，你都成小花猫了。"小丑鱼抖了抖身上的泥说："你是谁？"小水滴回答："我叫小水滴，你呢？""我的名字叫"小可豆"，"做个朋友吧。""好"。

他们来到了小可豆的家，"啊好多小丑鱼，不颜六色真好看呀！"

他们游着呀，漂着呀，一会儿就到了一片空地，开始了游戏，忽然，一只大鲨鱼扑来，小水滴闪到了一边，可小可豆被大鲨鱼吞进肚子里面。

这可怎么办呀？小水滴着急了，忽然，他眼珠一转，想出来个好办法，说："有本事和我比一比，我可比你强多了。"鲨鱼不相信，说："怎么个比法呀？""我们去撞那根大柱子，谁要是晕头，谁就胜了。""好，我先来。"只听一个声音啊——鲨鱼撞死了，小可豆终于被小水滴救了。回到小可豆的家，小可豆把事情告诉家里人，大家都说小水滴是个聪明而可爱的小孩子。

从此小水滴就去帮助别人了。水母，海马，贝壳他们都被小水滴帮助过，因此，小水滴的名子传遍了整个大海洋。（共380字

Figure 6. A Passage by a Pupil in Class 4, Grade 2, Fengning No. 1 Primary School

To enable a more comprehensive understanding of the pupils' progress in writing ability from the perspective of class collective development, we selected Class 4, Grade 2, of Fengning No.1 Primary School as research sample and conducted random test every month (except during summer and winter holidays) in the two-year experiment. We conducted 14 tests in total and calculate the average number of character, the most and the least numbers of character. We found the following:

- In the monthly writing test, pupils in experimental classes showed obvious sign of improvement on the average number of character, the most number of characters and the lowest number of characters.
- Some pupils in the experimental classes peaked after a certain period and stood out in the class.
- Pupils in the experimental class with the least number of characters showed obvious signs of improvement in their writing ability.

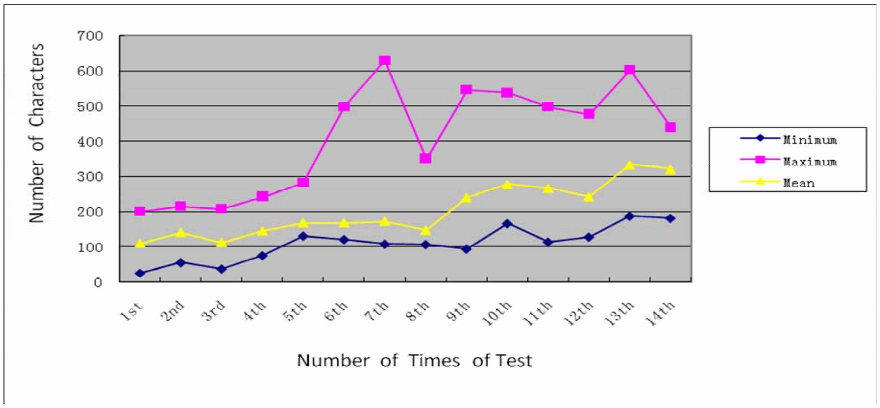


Figure 7. The Number of Character in Writing Test in Class 4 Grade 2 of Fengning No.1 Primary School

DISCUSSION

From the above analysis of the results we find that the level of character recognition, in-class reading and in-class writing in the first period has reached(even exceeded) the higher goal required in the second period. There are enough evidences to indicate a distinct improvement of learning efficiency represented by relationship between less time and high performance. Based on the results, the following discussion will respond to the two research questions as mentioned above.

The first research question related to approach for enhancing learning effiency in CCLL.Chinese language learning mainly consists of three parts: character recognition, reading and writing. Conventional CCLL ignores inner the link between Chinese language teaching and learning and thinking development and regards character recognition, reading and writing as three independent parts and to be carried out separately in different hours. They also regard pupils in lower grades as individuals with no ability in logic thinking and neglect to develop their potential in quality thinking. Therefore, they are not in favor of in-class writing that could represent pupils' logic thinking generally. However, applying language in authentic contexts is a fundamental way to help pupils quickly learn and master Chinese language (He, 2007). The pupils were by no means merely passive absorber of knowledge but individuals with thinking abilities, capable of acquiring information on their own and with ability to analyze, generalize, ascertain, deducting and imagining. Based upon traditional CCLL emphasis on character recognition and reading, we design a new approach for combining in-class writing with character recognition and in-class reading. Pupils begin in-class reading immediately after recognizing character, begin in-class writing immediately after in-class reading. All of these activities performed in one lesson (In pinyin instruction, oral expression instead of writing). We were pleased to find that pupils in experiment were able to write articles that are fluent and clear, complete in structure and with few misspelled or wrongly used words. These passages also showed logical thinking and imagination. By perfect union of character recognition, in-class reading and in-class writing, we find a new approach for combining Chinese language teaching and learning with thinking development, which enhances the quality and efficiency of CCLL and significantly improve pupils' abilities of character recognition, reading and writing. As this new approach involves the combination of three parts of character recognition, in-class reading and in-class writing, we call it "new three-in-one" pedagogy. We also found that pupils could read and write passages with inquiring mind, express their feelings and reflect on their own reading and writing, this could benefit the development of their intellectual quality.

The second research question is related to the influence of new pedagogy on the integration of ICT into CCLL. With regard to integration, we focus more on how they integrate rather than the degree of integration. Conventional theory of media focuses more upon the communicating process of information, and conventional theory of cognitive tools focus more upon how to help learners solve problems with high efficiency. These are merely one aspect of integrating ICT into the instructional process. What is even more important is to create a new instructional environment with the support of ICT (He, 2006), which has been seen as a new perspective. ICT could take the roles of tutors, peers, students and assistants. ICT could also imitate things to provide learners with an integrated environment that blend multiple interaction, independent exploration, emulation and simulation, collaborative communication, knowledge construction and so on, so as to bring the teachers' role of guiding and organizing into full play, and meanwhile fully develop learners' role as masters and subject of learning.

In the whole study, we could hardly feel the traces of ICT use. ICT is like "the hero behind the scenes", quietly supporting all kinds of learning activities. It creates the environment that help with the memorizing of new characters and phrases, enable pupils to read the texts with emotions, guide pupils' oral expression, help pupils to establish the relations between concepts so as to construct the meaning of knowledge, and remind pupils to accomplish learning tasks more accurately and smoothly. ICT not only promotes all activities in the process but also promotes pupils' zeal, activeness and interest in learning. This would benefit pupils' development in the non-intellectual quality.

CONCLUSIONS

This study investigates an approach to integrate ICT into CCLL and connects character recognition, reading with writing so that form a whole, student-centered approach to enhancing efficiency of Chinese language learning. The conclusions drawn from entire research are as follows:

(1) the three-in-one pedagogy of "character recognition, in-class reading and in-class writing" is a new approach for enhancing the efficiency of Chinese language learning at elementary schools, and
(2) The pedagogy provides a new perspective of integrating ICT into Classroom-based Chinese Language Instruction (CCLL).

In addition, some implications from our research are worth mentioning here:(a) for the acquisition of native language, the new three-in-one pedagogy is not only an approach for the fast grasp of Chinese. It might be able to be used for other languages., The pupils with Grade one may have potential to read and write simultaneously, the timely language knowledge applications in reading and writing task with authentic context and sustaining classroom practices may enhance the quality and efficiency of mother language learning for school-age children; (b)for successful technology use, the judgment should not stay on advanced or advanced hardware and software devices, but shift to knowledge building with technology and using appropriateness in special contexts; (c) the new three-in-one pedagogy provide possibility to look for a low-cost, high-efficiency approach for classroom teaching and learning for rural schools, enjoying good education in rural schools as well as in urban schools for every pupil through enhancing quality and efficiency of classroom teaching and learning should be regarded as main strategy of sustainable development for rural schools.

As CCLL is complicated and dynamic, and limited by the influences of many factors such as instructional thoughts, instructional contents, instructional resources, application of technological tools, teacher-students relationship, classroom capacity and so on, we are incapable of controlling all the independent variables to observe and analyze the changes of dependent variables. Data are mainly collected by teachers in the experiment, and in the method of testing we make a compromise between the efficiency and reliability of the testing. It is the limitation of this research.

REFERENCES

Cakir,I.(2006) The use of video as an audio-visual material in foreign language teaching classroom. *Turkish Online Journal of Educational Technology*,5(4),67-72.

Ding, Y.K. (2003) *Youkuan Ding and the method of Combining Reading and Writing*. Beijing, China:International Culture Publishing Company.

Dou, A.J. (2003) *Menglong Qian and Guided Reading in Chinese Language Instruction.* Beijing, China: International Culture Publishing Company.

Hong, Z.L. (1984) Ten rules of "leading reading". *Journal of Yangzhou Normal College (Edition of Social Science)* 2, 96-101.

He, K.K.(2000) *Theory of Creative Thoughts: The Construction and Demonstration of DC Model.* Beijing Normal University Press, Beijing, China.

He, K.K. (2002) On the cultivation of innovative thinking in Chinese education, *Beijing Education* ,12, 1-1.

He, K.K. ,& Ma, N. (2005) Innovative leapfrogging experiment for Chinese language education based on new theory of children's mental development. *China Educational Technology* ,227, 43-50.

He, K.K. (2006) In-depth integration of information technology into curriculum. *China Information Times*, 2, 47-56.

He, K.K. (2007) *New Theory of Children's Thinking Development and Its Application in Chinese Language Instruction*. Beijing Normal University Press, Beijing, China.

Isman, A.(2011) Instructional design in education:new model. *Turkish Online Journal of Educational Technology*,10(1),136-142.

Li, J.X. (1930) *New Work on Chinese Language Pedagogy*. Commercial Press, Shanghai, China.

Lü, S.X.(1987). *Shuxiang Lü on Chinese Language Instruction*. Shandong Education Press, Ji'nan, China.

Li, J.L.(1998) Move away the "two mountains" weighing on Chinese instruction. In WangLi(Ed.), *Deep thoughts and concerns on Chinese language education* (pp. 166-168). Educational Science Publishing House, Beijing, China.

Li, J.L. (2007) Theoretical nutrition for affective education given by "Artistic Conception Theory". *Education Research*, 325, 68-71.
Lin, C.D. (2007) The updated development of intelligence research and my insight into intelligence. *Journal of Ningbo University (Edition of Educational Science)*, 29(6), 1-5.
Ministry of Education of PRC (2002) *Experimental Edition of Chinese Curriculum Standard for Full-time Compulsory Education*. Beijing Normal University Press, Beijing, China.
Peng, X.M. (2008) On integration of modern information technology and Chinese language instruction. *Education Research*, 336, 84-87.
Wang, S.R. (1929) *Introduction to Chinese Language Instruction in Middle School*. Commercial Press, Shanghai, China.
Wu, Y.P. (2000) Research on Chinese language pedagogy before and after 1930's. *Chinese Language Instruction Communications*, 6, 16-17.
Yuan, Z. (1936) *On Chinese Language Reading Pedagogy*. Commercial Press, Shanghai, China.
Ye, C.C. (1953) From "Red Scarf" instruction to Chinese language reading pedagogy reform. *People's Education*, 7, 40-42.
Ye, S.T. (1959) Making efforts to learn Chinese well. In Guozheng Liu(Ed.), *Collection of Ye Shengtao's educational works volume three*(pp. 159-161). People's Education Press, Beijing, China.
Ye, S.T. (1959) On writing. In Guozheng Liu(Ed.), *Collection of Ye Shengtao's educational works volume three* (pp. 331-344). People's Education Press, Beijing, China.
Yu, Y.(1998) "Standardized examination" lead Chinese language instruction to "Blind Alley". In WangLi(Ed.),*Deep thoughts and concerns on Chinese language education*(pp. 197-201). Educational Science Publishing House, Beijing, China.
Yao, Z.Q.(2001) *Chinese Language Pedagogy from A Macroviewpoint (Revised Edition)*. China Social Sciences Press, Beijing, China.
Zhang, L.F. (1954) On several questions in Chinese language instructional reform. *People's Education*, 1, 54-59.
Zhang, W.Z. (2006) "Red Scarf" pedagogy and the education of literature. *Modern Chinese (Edition of Instructional Research)*, 7, 7-9.
Zhao, X. L. (2007) *Study on Classroom Teaching Patterns and Practice under MDEPRS Environment*. Unpublished Master Thesis, Beijing Normal University, Beijing, China

INTERNET ACCESS, USE AND SHARING LEVELS AMONG STUDENTS DURING THE TEACHING-LEARNING PROCESS

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ABSTRACT
The purpose of this study was to determine the awareness among students and levels regarding student access, use, and knowledge sharing during the teaching-learning process. The triangulation method was utilized in this study. The population of the research universe was 21,747. The student sample population was 1,292. Two different data collection methods were used from two different sources. Quantitative data were collected using a set form distributed to the students titled "The Internet in Teaching-Learning Processes Questionnaire". Qualitative data were also collected through a structured interview with 24 faculty members. The following results were obtained: 1. Instances of knowledge access, use and sharing by students during the teaching-learning process rank high. 2. Female students use the internet in a more functional sense than males. 3. The levels of students accessing, using, and sharing knowledge during the teaching-learning process differ. 4. Internet access, use, and knowledge sharing levels vary between academic departments. 5. Internet access, use and knowledge sharing levels differentiate according to type of education. 6. The opinions of faculty members and students overlap regarding the level of accessing knowledge via the internet, but differ on the subject of use and knowledge sharing.
Keywords: Learning, Teaching, Internet, Knowledge, Students, Faculty, Education.

INTRODUCTION

Information and communication technologies used to acquire knowledge have had a significant effect on the development of human beings during the second half of the twentieth century. For this reason, the 21st century is often referred to as the "knowledge society", "knowledge period" or "knowledge revolution". Innovative information and communication technologies have had major effects throughout all fields of study, above all education. In the 1980s, with the sudden proliferation of personal computers, the viewpoint that using information and communication technologies during the teaching-learning process would improve the quality of education and solve problems became widespread (IBE, 1997). Now the internet offers endless choices of information available to all and has become a symbol of change. The internet is affecting the education process for people by offering alternative, creative learning methods (İşman and Dabaj, 2004).

One of the core 21st century educative concepts is learning for knowledge (IBE, 1998). Because one of the central topics for the 21st century is technology, people and all concepts related to people make use of technology and its advantages. In the 21st century, it has become important for all members of society to make use of electronic literacy, informatics and communication technologies, as well as maintaining the knowledge and skill to use these actively and efficiently. Rapid developments and changes in information technologies are widely accepted as the most striking features of the information age, especially in the scope of the internet (Dursun, 2004; Gündüz & Hamedoğlu, 2003; Çavuş & Göktaş, 2008). Those who take advantage of these advances should be those involved with the teaching-learning process. This situation presents a unique double-sided quality which allows educators and students to make use of the advances of technology, while adding and creating new advances along the way.

The internet can be described as the net of nets that connects all computers in the world to each other (Ersoy and Yaşar, 2003), or the net of connections that covers the entire world. The internet is one of the most charismatic features of the information age. Using computers and the internet has become an indispensable part of daily life. In response to almost every inquiry, the internet is able to produce desired information easily and smoothly (Kılıç and Karaaslan, 2004). Thus, one of the most important concepts for the 21st century is using technology for more effective and permanent learning (Polka and Mattia, 2009). Acclimation to new technology in this new century has become compulsory in a sense while the education system, education programs, teaching-learning methods and teaching materials have changed. In almost every aspect of education, the applications of technology and the internet are becoming more widespread (Oral, 2004).

Currently, the internet affects every person's life in a comprehensive fashion (Ersoy and Yaşar, 2003). Some of these effects include the increase of communication, expanding educational services and an increase of quality along with personal interaction. The internet changed the concepts of place and time for education by moving education outside the school. Recently, more importance has been given to seeking, evaluating, organizing, using and sharing information with others (Karahan and İzci, 2001). The internet has become the most efficient source for information (Akkoyunlu, 2002), as well as the most efficient and valid method to share information with the masses in a rapid, easy, cheap, and reliable manner. All the while, the internet sharpens a person's ability to search and disseminate information.

Teaching can be described as organizing information and the environment to carry out learning. In other words, learning experiments or teaching-learning processes can be expressed as being organized with some essential stimulants in order to reach educational objectives such as methods, equipments, sources, etc. (Sönmez, 2007, 137).İşman and Eskicumalı (2006, 136) point out that because knowledge can be obtained rapidly, the use of technological developments in education is inevitable and will most likely continue. The use of the internet, television and similar devices affects the structure of the education system and the teaching-learning process. According to İşman & Eskicumalı, this influence will increase the quality of teaching-learning activities.

The internet is presently being used as a source for teaching material. According to Oral (2004), providing information and communication technologies for teaching-learning processes will have some advantages: students will play a more active role, discussions of courses will contain more detail, students will become more independent, communication between students and teachers will become level and direct, students will easily process new student-based education material, student skills will increase, and the hierarchical structure between teachers and students will be more flexible. The students will also be able to access information pertaining to their courses and activities from different sources quickly and without difficulty (Taşpınar and Gümüş, 2004), and will be able to evaluate these sources and synthesize them. Therefore, development in the learning environment will be suitable for each individual.

According to Taşpınar and Gümüş (2004), instructors and students are driving toward the same aims: to become computer literate, to increase knowledge of communication technologies, to utilize this knowledge during class, and to fully employ these skills while conducting research on the internet. Recently, one of the most common uses for internet research was found to be support for information submission (Ergün, 1998; Dursun, 2004). A number of instructors at higher education institutions share course notes, exams, and other visual materials via internet websites. Therefore, the use of the internet has changed the concept of "traditional" student and teacher roles (Oral, 2004). The role of the student includes not only absorbing information given to them, but also searching, analyzing and resubmitting information for others to use. This is a global phenomenon and for Turkey, discovering the internet's true potential for educational needs is a priority for the National Development Plan in response to the Ministry of National Education (Milli Eğitim Bakanlığı, 2002).

Turkish citizens were first connected to the internet in 1993 (Güdücü, 2006). The first signs of its use in the field of education were visible at the Middle East Technical University in 1998, followed by Istanbul Technical, Anadolu, Sakarya, and Boğaziçi Universities (Dursun, 2004). According to data gathered in 2009, the rate of computer usage for individuals between the ages of 16-74 in Turkey was 50.5%. Of these individuals, 30% were women. It was also found that 48.6% of the men and 28% of women utilized the internet. 88.5% of male internet users and 87.5% of female internet users were found to have graduated from high school and/or entered an undergraduate or graduate program at a university in Turkey (Türkiye İstatistik Kurumu, 2009, Mestçi, 2010). Internet users were most likely students and employers, followed by wageworkers and the jobless. People between the ages of 16-24 were found to use the internet more often than others (Devlet Planlama Teşkilatı, 2009), which includes students in high school as well as university. However, this finding does not necessarily indicate a higher use of the internet in teaching-learning processes. Most university students use the internet for chatting (51.7%) and other types of communication (45.6%). According to previous research (by Bozkurt and Zaim, 2008), internet usage by students can be distributed into the following categories: 97.8% email, 97.2% search engines, 86.7% file download, 76.2% written chat, 75.7% video chat, 68% file sending, 60.2% news groups, 58.6% audio chat, 23.2% FTP, and 2.4% other. In European Union countries, the rate of internet usage among their populations is 68% in contrast to Turkey at 32% (Devlet Planlama Teşkilatı, 2009). These results could indicate that people who have lower incomes and education levels in Turkey cannot yet access information and communication technologies (Öztürk, 2005).

Information acquisition and control of this information via the internet are primarily priorities for the intellectual population (Yıldırım & Bahar, 2008) and therefore affects those who have reached a level of higher education. These skilled individuals have the power to reach out and educate themselves on current events across the globe which then allows these individuals to become self-aware of their role in society. It has been said the 21st century will be the age of education as well as information and knowledge (Barkan, 1994). This underlines the requirement for all to have communication skills necessary for teaching and learning in the 21st century. Humans rely on the foundation of school as an institution and communication is at the center of this foundation (Saunders

& Mills, 1999). Therefore, communication skills should be a basic prerequisite for those wishing to develop and understand learning and teaching. Information has leaked from the classroom and has subsequently spread all over the world (Yıldırım & Bahar, 2008). The implementation of online learning and distance education has become quite common at higher learning institutions. The methods of e-learning require teaching material to be obtained via the internet making campus visits quite unnecessary. These new forms of study have launched the internet to a key position in education and the teaching-learning process.

In summary, accessing, using and sharing knowledge via the internet and other communication technologies lies in the interest of the educated, primarily those in the university level; those with the power for social change and development. For those university students carrying out this change, it could be said they have an obligation to be equipped with qualified cognitive, affective, and psychomotor proficiency during their studies. Producing knowledge and turning this knowledge into technology to facilitate an increasing quality of life and the students' ability to access and use this knowledge purposefully while sharing it at a high level is a requirement of the information era. Consequently, the purpose of this study was to determine the internet utilization level of university students. The research questions investigated were:

1. What level are the university students who access knowledge via the internet during the teaching-learning process?
2. What level are the university students who use this knowledge purposefully during the teaching-learning process?
3. What level are the university students who share this knowledge with others during the teaching-learning process?

METHOD

In this section information about the research method, population and sample, data collection and analysis is provided.

Research Method

In this study, the triangulation technique was used as a research method. The triangulation technique uses more than one method or source of data in the study of social phenomena (Bryman, 2001, 274). Also, the triangulation technique uses two or more methods of data collection in order to study more aspects of human behavior. The triangulation technique used in social science is an attempt to figure out, or explain more fully, the richness and complexity of human behavior while examining issues from more than one standpoint offering the researcher greater opportunities to use both quantitative and qualitative date (Cohen & Manion, 1998, 233).

Population and Sample

The population of the study is composed of 21,747 students from Sakarya University in Turkey. In those cases where the number of the participants is known, the sample of the study involves 1,292 students –639 female and 653 male– determined by the sampling method. The sample of research is 95% reliable with 3% fallibility since the bottom and top borders of the realization rate is made up of students whose access, use, and sharing of knowledge during the teaching-learning process is not known. The number of participants is determined by the rational sampling method since the number of the students in each department is not equal. The sample of the research shows the variance as: 256 (19,8 %) engineering, 254 (19,7 %) education, 285 (22,1 %) science-literature, 114 (8,8 %) technical education, 56 (4,3 %) theology, 283 (21,9 %) economics and 44 (3,4 %) physical education and sport.

Data Collection and Analysis

The data in the study were gathered by using two different methods and sources. Quantitative data were collected from a set form titled, "The Internet in Teaching-Learning Processes Questionnaire", developed by the researcher and based on expert opinions. The internal consistency reliability of the questionnaire, or Cronbach's alpha, measured 0.88. The first section of the questionnaire requested some personal information from the participant. The second asked questions pertaining to the participant's use of the internet to access, use, and share knowledge during teaching-learning activities. The analyses quantitative data: the average points the student scored on the subscale of the "The Internet in Teaching-Learning Processes Questionnaire" were found and one above and one below of standard deviations scores were taken as cut-off scores. For questions pertaining to knowledge access, it was concluded that those who scored below 8 points were assigned to the low level, those who scored between 8-14 points were the middle level, while the ones who scored 15 were at the high level; for questions pertaining to using and sharing knowledge, those who scored below 7 points were assigned to the low level, those who scored between 7-13 points were the middle level, while those who scored 14 points and above make use of the internet during teaching-learning activities at a high level.

The structured interview was used as a secondary research method. The structured interview is a research method where a person responds to answers with information about themselves according to definite categories. The greatest advantage of this method is minimizing the differences among the applicants in situations where there is more than one applicant (Türnüklü, 2000). Qualitative data were collected through this interview method from 24 university faculty members who were actively employed. Three questions were asked to each member concerning their level of access, use, and sharing of information via the internet during the teaching-learning process. The data were analyzed by compiling the common components found in the answers given.

Findings

This section includes the results and analysis of research problems and data obtained pertaining to subordinate problems in each section.

Table 1. Point Averages for Accessing, Using Purposefully and Sharing Knowledge by Students via the Internet during the Teaching-Learning Process

Internet	N	Low		Medium		High	
	Total	N	%	N	%	N	%
Accessing	1292	145	11.2	1032	79.9	115	8.9
Using	1292	145	11.2	1110	85.9	37	2.9
Sharing	1292	179	13.9	1065	82.4	48	3.7

According to Table 1, the level of accessing knowledge by students via the internet in teaching-learning activities started at a low 11.2%, middle 79.9%, and high 8.9%. The level of using knowledge purposefully started at a low 11.2%, middle 85.9%, and high 2.9%. The level of sharing knowledge started at a low 13.9%, middle 82.4%, and high 3.7%. In this situation, it can be stated that accessing, using purposefully and sharing knowledge by the students via the internet during the teaching-learning process are at the middle level.

Table 2. With The Addition of Gender Variables; Accessing, Using Purposefully and Sharing Knowledge by Students via the Internet during the Teaching-Learning Process

Internet	Gender	N	Mean	Std. Deviation	t values
Accessing	Female	639	10.89	1.97	t= 4.05
	Male	653	10.43	2.14	df= 1290
					p<.001
Using	Female	639	10.41	1.97	t= 5.75
	Male	653	9.72	2.30	df= 1290
					p<.001
Sharing	Female	639	10.18	2.04	t= 5.92
	Male	653	9.46	2.29	df= 1290
					p<.001

According to the gender variables in Table 2, females use the internet in a more functional sense than males according to the following data. Accessing knowledge [$t_{(1290)}$=4.05, p<.001], using knowledge purposefully [$t_{(1290)}$=5.75, p<.001] and sharing knowledge [$t_{(1290)}$=5.92, p<.001] via the internet during teaching-learning activities.

Table 3. With the Addition of Class Level Variables; Accessing, Using Purposefully and Sharing Knowledge by Students via the Internet during the Teaching-Learning Process

Internet	Grades	N	Mean	Std. Deviation	df	F-Values F	F-Values P	Source of Variance
Accessing	1st year	424	11.01	2.07				1>2, 1>4
	2nd year	298	10.42	2.11				
	3rd year	265	10.89	2.06	3-1288	11.90	P<.001	3>4
	4th year	305	10.20	1.93				
	Total	1292	10.66	2.07				
Using	1st year	424	10.35	2.16				1>4
	2nd year	298	9.94	2.22				
	3rd year	265	10.31	2.07	3-1288	9.87	P<.001	3>4
	4th year	305	9.55	2.13				
	Total	1292	10.06	2.17				
Sharing	1st year	424	10.02	2.15				1>2

2nd year	298	9.43	2.21				
3rd year	265	10.04	2.21	3-1288	5.41	P<.001	3>2
4th year	305	9.72	2.20				
Total	1292	9.82	2.20				

According to Table 3, the higher the students' class level is, the more their level of accessing, using purposefully and sharing knowledge of via the internet during the teaching-learning process differentiate. In regard to student knowledge access, the difference is notable at the level [$F_{(3\text{-}1288)}$=11.90, p<.001] between the 1st and 2nd year students, 1st and 4th year students and 3rd and 4th year students. Using knowledge purposefully is notable at the level between the 1st and 4th year students and 3rd and 4th year students at the level of [$F_{(3\text{-}1288)}$=9.87, p<.001]. The sharing of knowledge is remarkable between the 1st and 2nd year students, 3rd and 2nd year students at the level of [$F_{(3\text{-}1288)}$=5.41, p<.001]. The students not only view the internet as a source for accessing, using, and sharing knowledge, but also a medium with alternative uses.

Table 4: With the Addition of Academic Department Variables; Accessing, Using Purposefully and Sharing Knowledge of the Students via Internet in Teaching-Learning Process

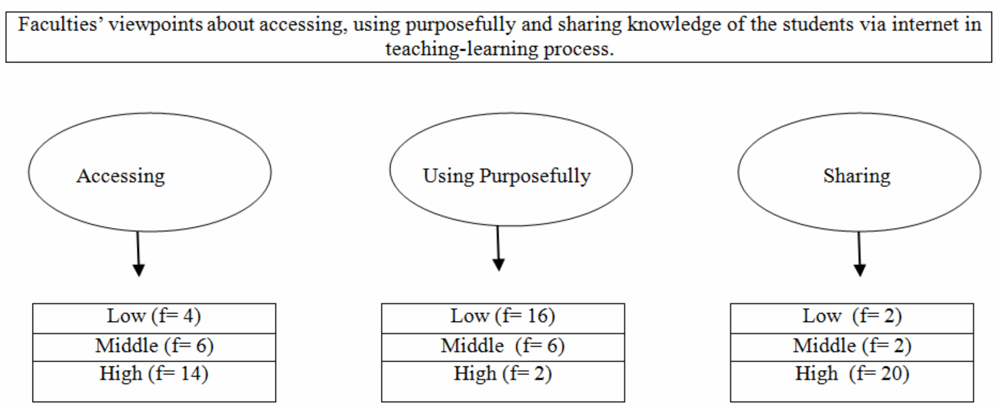
						F-Values		
Internet	Department	N	Mean	Std. Deviation	df	F	P	Source of Variance
Accessing	1.Engineering	256	10.45	2.12				
	2. Education	254	11.23	1.80				2>1, 2>3 ,2>5
	3. Science & Art	285	10.46	2.18				
	4. Technical Ed.	114	10.52	2.24				
	5. Theology	56	10.11	1.49	6-1285	5.32	P<.001	
	6- Economy	283	10.63	2.03				
	7- Physical &Sports	44	11.11	2.41				
	Total	1292	10.66	2.07				
Using	1.Engineering	256	9.59	2.29				
	2. Education	254	10.58	1.91				2>1, 2>3
	3. Science & Art	285	9.89	2.23				
	4. Technical Ed.	114	9.93	2.35				
	5. Theology	56	10.09	1.63	6-1285	5.27	P<.001	
	6- Economy	283	10.16	2.12				
	7- Physical &Sports	44	10.52	2.29				
	Total	1292	10.06	2.17				
Sharing	1.Engineering	256	9.25	2.06				
	2. Education	254	10.26	1.90				2>1, 2>4
	3. Science & Art	285	9.83	2.19				
	4. Technical Ed.	114	9.34	2.28				
	5. Theology	56	10.27	1.69	6-1285	6.48	P<.001	
	6- Economy	283	9.96	2.41				6<1
	7- Physical &Sports	44	10.18	2.72				
	Total	1292	9.82	2.20				

According to Table 4, levels of accessing, using purposefully and sharing knowledge by students via the internet during the teaching-learning process differ between different academic departments. Clearly, students in the education department favor accessing, using purposefully and sharing knowledge via the internet during the teaching-learning process. The differentials for the education, engineering, science-literature, and theology departments in respect to knowledge access equate to [$F_{(6\text{-}1285)}$=5.32, p<.001]. In respect to using knowledge purposefully, the differentials for the education, engineering, and science-literature departments equate to [$F_{(6\text{-}1285)}$=5.27, p<.001]. In correspondence with knowledge sharing, the education department differentiates from the engineering and technical education departments, while physical education and sport differentiates from the engineering department at the level [$F_{(6\text{-}1285)}$=6.48, p<.001].

Table 5. With the Addition of Two Subsections (Day/Evening) Among Education Students; Accessing, Using Purposefully and Sharing Knowledge by Students via the Internet during the Teaching-Learning Process

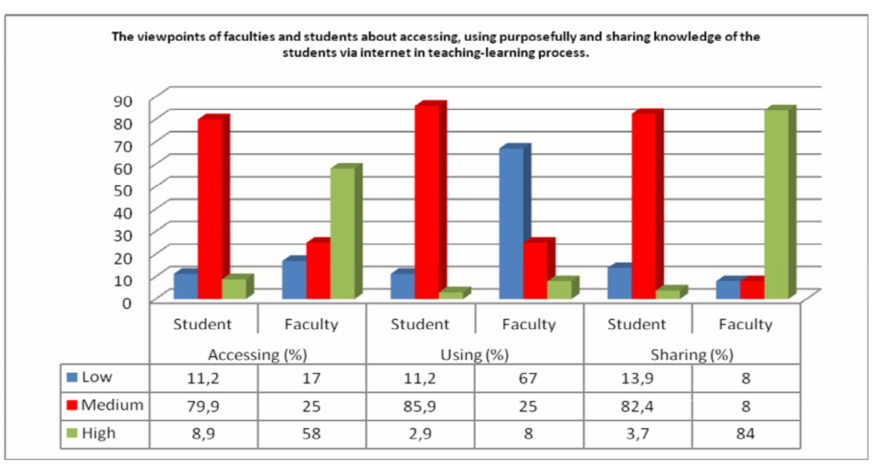
Internet	Type of Education	N	Mean	Std. Deviation	t values
Accessing	Day	1043	10.70	2.08	t= 1.29
	Evening	249	10.51	2.03	df= 1290
					p>.05
Using	Day	1043	10.10	2.17	t= 1.48
	Evening	249	9.88	2.15	df= 1290
					p>.05
Sharing	Day	1043	9.79	2.19	t= -.727
	Evening	249	9.91	2.25	df= 1290
					p>.05

According to Table 5, the point averages associated with the access, use and sharing of knowledge by students via the internet during the teaching-learning process differentiate between students studying day education and those studying night education. Those students who chose day education favor accessing and using knowledge purposefully, while the night education students scored higher in the knowledge sharing category. However this differentiation is minor for all categories; accessing knowledge at the level [$t_{(1290)}$=1.29, p<.05], using knowledge purposefully at the level [$t_{(1290)}$=1.48, p<.05], and sharing knowledge at the level [$t_{(1290)}$= -.727, p<.05] .



Shape 1. The Opinion Gathered From Faculty Members Regarding the Access, Use and Sharing of Knowledge by Students via the Internet during the Teaching-Learning Process

According to faculty members, accessing knowledge by the students via the internet is high at 58%, middle 25%, and low 17%; using knowledge purposefully is low with 67%, middle 25% and high 8%; sharing knowledge high 84%, middle 8%, and low 8%. The opinions of faculty members and students concerning accessing, using purposefully and sharing knowledge by students via the internet during the teaching-learning process are compared in Graph 1.



Graph 1. The Opinions of Faculty Members and Students Concerning Accessing, Using Purposefully and Sharing Knowledge by Students via the Internet during the Teaching-Learning Process

In shape 1, the opinions from faculty members and students concerning accessing knowledge via the internet overlap. However, a gap widens regarding using knowledge purposefully and sharing knowledge.

DISCUSSION AND CONCLUSIONS

The main purpose of this research was to determine to which extent students access, use, and share knowledge via the internet by collecting data from both students and faculty members. Based on the results of this research, it can be concluded that the level of knowledge access by students via the internet during the teaching-learning process is high. Students are definitely utilizing the internet during their education and the teaching-learning process. As stated before, in Turkey, most university students at the graduate level (87.5%) use the internet (TUİK, 2009), while 82% of these cannot bear the thought of daily life without access to the internet (Eğitişim Career Institute*,* 2010). Also, the results conclude that levels of using knowledge with purpose and sharing knowledge are high as well. These results exceed the numbers produced from earlier research. According to previous studies, the rate of internet use to the sole purpose of educational activities by was 23.6% (Atav, Akkoyunlu and Sağlam 2006), 49.1% (Toprakçı, 2010) and 15.5% (Demir, 2001); the rate of sharing the knowledge which was accessed and used was 34.2% (Toprakçı, 2010).

During teaching-learning activities, females use the internet in a more functional sense than males. These results are concurrent with those from previous studies. This finding overlaps with the research conclusions in literature. According to the research conclusions of Tutkun, Erdoğan and Arslan (2010), female students hold higher standards concerning educational activities when compared with males. This may be because female students also tend to have higher standards of responsibility for teaching-learning processes and helping attitudes in a classroom environment. Also, the level of a student's class corresponded with their level of internet access, use and knowledge sharing. Reasons for this phenomenon may lie in students' desire to obtain knowledge from multiple sources in addition to the internet during the teaching-learning process in order to obtain a higher class level.

Variations could also be seen when comparing internet use with the students' corresponding academic department. The education department scored highest for internet access when compared to the engineering, science-literature and theology departments. Those in the education department also use knowledge with purpose more often than those from engineering and science-literature, in addition to sharing knowledge at a higher level than the engineering and technical education departments. All this differentiation agreed with the earlier research of Demir (2001). This may be due to the education department's awareness for the need of centralizing the role of the internet in the classroom for those students the graduating teachers will one day educate. Another factor added to the test was the differences between education majors focusing on either day or night education. While those concentrating on day education were more likely to access and use knowledge with purpose via the internet, it was more prevalent for those with a night education concentration to share knowledge. These results may be caused by the view that continuance with students is important to the day shift teaching type, whereas night shift teaching prefers to focus on thinking about and sharing their thoughts with others.

There are noticeable overlaps between the opinions of students and faculty members regarding the level of accessing knowledge via the internet. However, some differences arise concerning the use of this knowledge. These conclusions overlap with the findings of Demir (2001). The viewpoint that it is necessary to access the internet during the teaching-learning process is common among faculty members. However, they also believe students cannot obtain true knowledge or choose knowledge with purpose via the internet. Faculty members are of the opinion that the internet causes students to slack off in their studies and research and the students' awareness of internet utilization is low. Due to knowledge pollution on the internet, students cannot access true data sources and therefore the internet simply provides students with class necessities without adding to their cognitive processes. Students simply do not internalize the data before going back out and sharing with others who also have the aim of learning.

LIMITATIONS

There are several limitations to this research. First, only one university was included in the research population. This population might have been extended to include universities at different development levels and within different geographic regions. Also, the quantitative data were collected not only from the teaching staff but also from students using the structured interview method.

IMPLICATIONS AND RECOMMENDATIONS

The results of this investigation could have important implications for more effective use of the internet and communication technologies during the teaching-learning process. A curriculum on the subject of internet use could be created as extracurricular activities for students. Students should have the ability to use the internet effectively in school, home and social life.

According to all findings, in conclusion of the research and for the sake of future studies, these suggestions can be made: 1- Students should be educated in order to produce progressive attitudes towards accessed knowledge via the internet. 2- Students should be educated about accessing knowledge, using it with purpose, and sharing. 3- Faculty members should offer information to students about how to use internet and they should evaluate their activities in order to give feedback about the conclusions.

REFERENCES

Akkoyunlu, B. (2002), Öğretmenlerin internet kullanımı ve bu konudaki öğretmen görüşleri. *H.Ü. Eğitim Fakültesi Dergisi*, 22, 1-8.

Atav, E., Akkoyunlu, B. & Sağlam, N. (2006). Öğretmen adaylarının internete erişim olanakları ve kullanım amaçları. *H.Ü. Eğitim Fakültesi Dergisi*, 30, 37-44.

Barkan, M. (1994). *Eğitim İletişimi.* Eskişehir: Anadolu Üniversitesi Yayınları.

Börü, D. (2010). *Öğrencilerin bilgisayar ve internet kullanımına ilişkin bir araştırma*. Retrieved May 1, 2010 from www.econturk.org/Turkiyeekonomisi/deniz3,

Bryman, A. (2001). *Social research method.* New York: Oxford University Press.

Cohen, L. & Manion, L. (1998). *Research methods in education.* New York: Routledge.

Çavuş, H. & Göktaş, İ. (2006). Eğitim Fakültesi'nde öğrenim gören öğrencilerin internetten yararlanma nedenleri ve kazanımları. *Y.Y.Ü. E.F. Dergisi*, 3, 2, 56-78.

Demir, S. (2001). *Öğretim elemanları ve öğrencilerin internetin öğretim amaçlı kullanımına ilişkin görüş ve tutumlarının incelenmesi (Gaziantep üniversitesi fen-edebiyat fakültesi örneği).* Yayınlanmamış Yüksek Lisans Tezi, G.A. Ü. Sosyal Bilimler Enstitüsü.

Devlet Planlama Teşkilatı. (2009). *Bilgi toplumu istatistikleri.* Ankara: Devlet Planlama Teşkilatı.

Dursun, F. *(2004)* Üniversite Öğrencilerinin İnterneti Kullanma Amaçları. *XIII. Ulusal Eğitim Bilimleri Kurultayı, 6-9 Temmuz,* Malatya.

Eğitişim Kariyer Enstitüsü. (2010). *Gençler ne düşünüyor?* Retrieved June, 17 2010 from http://213.243.39.229/haber/,.

Ergün, M. (1998). İnternet destekli eğitim. *A.K.Ü. Sosyal Bilimler Dergisi,*1,1-10.

Ersoy, A. & Yaşar, Ş. (2003). İlköğretim 4. ve 5. Sınıf öğrencelerinin internet kullanma durumları. *Türk Eğitim Bilimleri Dergisi*, 1, 4, 401-426.

Güdücü, B. (2006). *Bir kamusal alan olarak Türkiye'de internet kullanımı*. Yayınlanmamış Yüksek Lisans Tezi, M. Ü. Sosyal Bilimler Enstitüsü.

Gündüz, H. B. & Hamedoğlu, M. A. (2003). Liselerde sayısal kopuş (Sakarya ili örneği). *S.A.Ü. E.F. Dergisi,* 6, 214-245.

IBE-International Bureau of Education. (1998). Curriculum development. *Educational Innovation and Information*, 97.

IBE-International Bureau of Education. (1997). Information and communication technologies in education. *Educational Innovation and Information*, 91.

İşleyen, F., Bozkurt, S. & Zayim, N. (2008). Tıp fakültesi birinci sınıf öğrencilerinin eğitimde internet kullanımı ve e-öğrenim hakkında düşünceleri. *Akademik Bilişim*, 30 Ocak-01 Şubat, Çanakkale.

İşman, A. & Dabaj, F. (2004). Attitudes of students towards internet. *Turkish Online Journal of Distance Education*, 5, 4, 31-36.

İşman & Eskicumalı (2006). *Öğretimde planlama ve değerlendirme.* Ankara: Sempati Yayıncılık.

Kalaycı, T. E. (2008). İnternet haftası. *EMO İzmir Şubesi Bülteni.*

Karahan, M. & İzci E. (2001). Üniversite öğrencilerinin internet kullanım düzeyleri ve beklentilerinin değerlendirilmesi. *Milli Eğitim Dergisi,* 150.

Kılıç G. & Karaaslan H. (2004). *Okullarda internet kullanımı: avantajları, dezavantajları ve alınması gereken tedbirler.* Retrieved June 26, 2010 from http://www.egitim.aku.edu.tr/bagci1.

Milli Eğitim bakanlığı. (2002). *Okullarda bilgi teknolojileri uygulamalarına yönelik çalışmalar*. Retrieved March 21, 2010 from http://egitek.meb.gov.tr/egitek/EgitimMateryali/.

Mestçi, A. (2010). *Türkiye'de internet raporu 2007.* Retrieved Feb 9, 2010 from http://www.internetpazarlama.net/index.

Oral, B. (2004). Öğretmen adaylarının internet kullanma durumları. *Elektronik Sosyal Bilimler Dergisi,* 3, 10, 1-10. Retrieved Jan 10, 2010 from http://www.e-sosder.com.

Öztürk, l. (2005). Türkiye'de dijital eşitsizlik: Tübitak-Bilten anketleri üzerine bir değerlendirme. *E. Ü. İktisadi ve İdari Bilimler Fakültesi Dergisi*, 24, 111-131.

Polka, W. S. & Mattia, P. R. (2009). *Curriculum Planning in the Twenty-First Century: Managing Technology, Diversity, and Constructivism to Create Appropriate Learning Environments for All Students.* Retrieved Dec. 16, 2010 from http://www.icte.org/T01_Library/T01.

Saunders, S. & Mills, M. A. (1999). *The knowledge of communication skills of secondary graduate student teachers and their understanding of the relationship between communication skills and teaching.* Retrieved Feb. 4, 2010 from http://www.Aare.Edu.Au.

Sönmez, V. (2007). *Program geliştirmede öğretmen el kitabı.* Ankara: Anı Yayıncılık.

Taşpınar, M. & Gümüş, Ç. (2004). Öğrenmeyi öğrenme kapsamında internet kafelerin eğitsel bir araç olarak kullanımı. *XIII. Ulusal Eğitim Bilimleri Kurultayı*, 6-9 Temmuz, Malatya.

Toprakçı, E. (2010). *Üniversite öğrencilerinin internet ders amaçlı kullanım profilleri (İnterneti ders amaçlı kullanım modeli).* Retrieved May 12, 2010 from http://public.cumhuriyet.edu.tr/etoprakci/.

Tutkun, Ö. F., Erdoğan, D. G. & Arslan, S. (2010). İnternet sitelerinin eğitim ve teknik eğitim fakültesi öğrencilerinin okul etkinlikleri ile ilgili amaçlarını karşılama düzeyi. IETC 2010-*International Educational Technology Conference,* April 26-28, Istanbul, Conference Proceedings, 2, 855-858.

Türkiye İstatistik Kurumu (2009). 2009 Yılı Hane Halkı Bilişim Teknolojileri Kullanım Araştırması Sonuçları, *Haber Bülten*, 147.

Türnüklü, A. (2000). Eğitim bilim araştırmalarında etkin olarak kullanılabilecek nitel bir araştırma tekniği: Görüşme. *Kuram ve uygulamada Eğitim Yönetimi*, 24, 543-559.

Yıldırım, S. & Bahar, H. H. (2008). *Eğitim fakültesi öğrencileri ile meslek yüksek okulu öğrencilerinin internete karşı tutumları (Erzincan üniversitesi örneği).* Retrieved January 10, 2010 from http://www.sosyalbil.selcuk.edu.tr/sos_mak/.

INVESTIGATING PRE-SERVICE EARLY CHILDHOOD TEACHERS' ATTITUDES TOWARDS THE COMPUTER BASED EDUCATION IN SCIENCE ACTIVITIES

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ABSTRACT
The purpose of this study was to investigate pre-service early childhood teachers' attitudes towards using Computer Based Education (CBE) while implementing science activities. More specifically, the present study examined the effect of different variables such as gender, year in program, experience in preschool, owing a computer, and the frequency of computer usage on pre-service early childhood teachers' attitudes towards using CBE while implementing science activities. The study was conducted by survey method and the data were collected by using two instruments which were "Demographical Questionnaire" being developed by researchers and "The Scale of Attitude toward Computer Based Education" being developed by Arslan (2006) and adapted by the researchers for early childhood education domain specifically. The sample of this study was 215 freshmen and senior early childhood teacher candidates attending state universities in Ankara. The data were analyzed by conducting t-tests and ANOVA in order to determine the effect of independent variables on CBE attitudes.
Keywords: computer based education, early childhood education, pre-service teacher, science activities, and attitude.

INTRODUCTION

Nowadays, previous knowledge and skills are seen as obsolete and educational theories are required to be updated since teaching and learning perspective has changed (Molnar, 1997). In this change, technology has become a great power by providing rich environments for learning/teaching in education and it can be profited for instructional environment as much as other areas (Haugland, 2000; Marina, 2001). Although it was thought that computers were expensive and luxury machines in previous years, anymore computers have become part of daily life in recent times and as NAEYC indicated computers are integrated into early childhood practice physically, functionally, and philosophically" (1996, p.2). Additionally, research points to the significant contribution of computer use in the classroom as a learning tool in terms of enhancing cognitive, social, emotional, linguistic, and literacy skills in preschool children with considering their ages (Clements 1995; Haugland 1992; Shade 1994;Vernadakis, Avgerinos, Tsitskari, & Zachopoulou , 2005). Indeed, Kulik (1994) found that students from kindergarten to higher education and using computer based instruction got higher scores on achievement tests, learned in less time, and were more likely to develop positive attitudes in his meta-analysis study. When the effects of computers and computer applications are examined in science education, Gordin and Pea (1995) emphasize that it can be benefited from computer-based applications as powerful tools because they include visualization, modeling, and simulation for teaching scientific concepts and provide students opportunity to master concepts usually considered too complicated for their grade level. As technology becomes easy to use and early childhood software grows rapidly, early childhood teachers have a responsibility to critically investigate the impact of new technologies on children and arrange to use technology to benefit children in learning environments (Haugland, 2000; Hartle, 2006; NAEYC, 1996, Yelland 2006). Even though teachers have some responsibilities, it is related with their attitudes in order to implement computers and computer based applications in educational system effectively (Yakin & Sumuer, 2007; Zhao, Tan & Mishra, 2001). Similarly, teacher candidates' attitudes play important role to achieve the integration of computers in educational environments (Yakin & Sumuer, 2007). Hence, it is essential to investigate pre-service teachers' attitudes towards using CBE for science activities in early childhood education.

ATTITUDE TOWARDS COMPUTER

According to Fishbein and Ajzen (1975, p. 6), attitude is ''a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object". In this theory, individuals' attitudes constitute their behavioral intensions. In addition, computer attitude has been described as a person's general evaluation or feeling of sympathy or antipathy toward computer technologies and specific computer linked activities (Smith, Caputi & Rawstorne, 2000). In the light of Fishbein and Ajzen's theory and computer attitude definition, it can be drawn conclusion that the profile of teacher's attitudes towards computer determines the degree of her/his intentions to use computer in teaching. This conclusion is supported with Levine and Donitsa-Schmidt's (1998) study emphasizing that an individual's behavioral intentions are determined by his/her attitudes towards computer.

The existing literature indicates that there are several factors influencing attitudes toward computer such as gender, age, computer experience, owing a computer and the frequency of computer usage. First, when the impacts of gender on attitudes are analyzed, it is seen that research present conflicting results. For example; some studies affirmed males had more positive attitudes than female (Bebetsos and Antoniou, 2009; Brosnan & Lee, 1998; Comber, Colley, Hargreaves, & Dorn, 1997; Torkzadeh & Van Dyke, 2002; Williams, Ogletree, Woodburn, & Raffeld, 1993). On the contrary, some other studies found that females had more positive attitudes than males (Ray, Sormunen & Haris, 1999; Rugayah, Hashim & Mustapha, 2004). It was stated in some studies that gender had no significant effect on attitudes (Kutluca & Ekici, 2010; Ropp, 1999; Roussos, 2007; Teo, 2008). Second, some studies investigated the effect of age on attitudes and found that younger people had more positive attitude than older people (Deniz, 2005; Erkan, 2004 Selwyn, 1999). The others confirmed that age didn't have a significant effect on attitudes (Gerçek, Köseoğlu, Yılmaz & Soran, 2006; Teo, 2008). Third, when the influence of computer experience on attitudes examined some studies demonstrated that computer experience had a significant effect on attitude (Asan, 2002; Kutluca, 2011). However, Yakin and Sumuer (2007) uttered that computer experience had no significant effect on attitudes. Forth, the studies analyzing the impact of owing computer on attitude were explored that this factor had a significant effect (Çelik & Bindak, 2005; Khine, 2001; Pamuk & Peker, 2009; Taghavi, 2006; Akbulut, 2008). On the other hand, in some studies there was no meaningful difference between computer ownership and attitudes toward computer (Aral, Ayhan, Ünlü, Erdogan & Ünal, 2007; Erkan, 2004). Lastly, the studies about the effect of the frequency of computer usage on attitudes showed that there was a statistically significant effect (Birgin, Kutluca, Çatlıoğlu, 2008; Mitra, 1998; Tsitouridou & Vryzas, 2003). On the other hand, Gercek et al. (2006) found no meaningful difference between frequency of computer usage and attitudes toward computer.

THE STUDY

The Purpose of the Study

The purpose of this study is to determine pre-service early childhood (ECE) teachers' attitudes towards using Computer Based Education (CBE) while implementing science activities and to investigate effects of some independent variables such as gender, year in program, experience in preschool, owing a computer, and the frequency of computer usage on their attitudes.

Research Problem

In this research there are three questions as following:

1) What is the status of pre-service ECE teachers' attitudes towards using CBE while implementing science activities?
2) Is there a significant difference between attitudes towards the CBE while implementing science activities and gender, program in year, having practice, having a computer, frequency of computer usage of pre-service early childhood teachers?
3) Is there a significant difference between attitudes towards the CBE while implementing science activities and independent variables of pre-service ECE teachers in terms of university type?

Research Design

This study was designed as a survey research. It was conducted to examine attitudes and demographic information of students in early childhood teacher education program attended freshmen and senior grade in spring of 2011 semester.

Context

The context of the study was set in two state universities in Ankara, Turkey. One of these universities' languages of education is English and in this university (University1), students take general computer course as "Introduction to Information Technologies and Applications" in their first year, "Computer Applications in Education" in second year, and "Instructional Technology and Material Development" in the third year. Moreover, students take "Basic Science" course and "Teaching Science in Early Childhood" in the second year. On the other hand, other university's language of education is Turkish and in this university (University2), students take general computer course as "Computer I" and "Computer II" in first year and "Instructional

Technology and Material Design" in second year. Moreover, the students take "Science Education" course in third year.

Participants

Participants of this study were comprised of 58 pre-service ECE teachers from one university and 157 pre-service ECE teachers from other university, which were totally 215 with a mean age of 21 years (range 17-32). Most of the participants (40.5%) graduated from Anatolian Teacher Training High School, 22.3% graduated from Anatolian High School, 18.6% graduated from Vocational High School, 9.3% graduated from General High School, 4.2% graduated from Foreign Language Intensive High School, 0.9% graduated from Science High School and 3.7% graduated from other high schools. Moreover, according to results, 3.3% of participants indicated that they started to use computer in early childhood term, 63.8% of them started to use computer in elementary term, 26.5% of them started to use computer in high school, and 7.4% of them started to use computer in university term.

Data Instruments and Data Collection

In this study, data were collected by using two instruments namely "Demographical Questionnaire" and "The Scale of Attitude toward Computer Based Education". Demographical questionnaire was developed by researchers and reviewed by an expert. This questionnaire included thirteen items to obtain information about gender, age, grade, high school type, term of using computer, frequency of computer usage, purposes of computer usage, having computer, self evaluation about computer usage, having experience in an early childhood institutes, attending science course, and attending computer course. On the other hand, the scale of attitude toward CBE was developed by Arslan (2006) including 10 positive items and 10 negative items with 5-point likert scale. Kaiser-Meyer-Olkin (KMO) value of this scale was 0.88 and Barlett test significance value was 0.000. Cronbach- alpha value was 0.93 which means as good. It was adapted by the researchers for early childhood education domain specifically with keeping original form and checked by the experts. Therefore, the validity and reliability of this scale were satisfied.

Data Analysis

In order to determine the status of pre-service ECE teachers' attitudes toward the CBE while implementing science activities, the data were analyzed through frequency, mean, percentage, and standard deviation values as descriptive statistics. Moreover, independent sample t-tests were conducted to examine impacts of independent variables (gender, program in year, having practice, having a computer) on attitudes, and since there are more than two levels of frequency of computer usage, it was used one way ANOVA for group comparison, besides a Post-Hoc Tukey HSD test was employed to find which group causes the difference in the group comparison. Furthermore, in order to indicate whether university type makes a significant effect while explaining influences of independent variables on attitudes, independent sample t-tests were used.

RESULTS

Demographics of the Participants

Of the 58 participants, 53.4% were freshmen and 46.6% were senior, 94.8% were female and 5.2% were male, nearly all of them (98.3%) had their own computer, 60.3% had practice in an early childhood institution while 39.7% have not, 46.6% attended science course while 53.4% did not, and 82.8% attended computer course whereas 17.2% did not attend in University1. On the other hand, of the 157 participants, 51.6% were freshmen and 48.4% were senior, 94.3% were female and 5.7% were male, most of them (76.4%) had their own computer, 54.8% had practice in an early childhood institution while 45.2% have not, 49.2% attended science course while 51.3% did not, and 97.5% attended computer course whereas 2.5% did not in University2.

Table 1: Participants' attitude scores towards CBE in science activities

	N	Minimum	Maximum	Mean	Std. Deviation
Total_attitude	215	37,00	87,00	69,9767	8.00668

According to Table 1, mean of pre-service ECE teachers' attitudes towards using CBE while implementing science activities is 69.97 (minimum 37, maximum 87).

Effects of Gender on Pre-service ECE Teachers' Attitude towards CBE in Science Activities

According to t-test results, it is found that there is no significant difference in attitude scores towards CBE in science activities between female pre-service ECE teachers (*M*=70.11, *SD*=8.04) and male pre-service ECE teachers (*M*=67.58, *SD*=7.24); *t* (213)= 1.06, *p*=.28 (two tailed).

Table 2: T-test result on gender and attitude towards CBE in science activities

		F	Sig.	T	df	Sig. (2-tailed)
Total_attitude	Equal variances assumed	,153	,696	1,066	213	,288
	Equal variances not assumed			1,171	12,659	,263

Effects of Year in Program on Pre-service ECE Teachers' Attitude towards CBE in Science Activities

An independent sample t-test was conducted to compare the attitude scores towards CBE in science activities for freshmen and senior pre-service ECE teachers. Results shows that there is no significant difference between the scores for freshmen pre-service ECE teachers (*M*=69.56, *SD*=7.15) and senior pre-service ECE teachers (*M*=70.42, *SD*=8.85); *t* (213) = -0.79, *p*=.43 (two tailed). On the other hand, when it is examined in terms of university type, there is a significant difference between attitude scores towards CBE in science activities for freshmen pre-service ECE teachers (*M*=69.77, *SD*=6.79) and senior pre-service ECE teachers (*M*=74.33, *SD*=5.49); *t*(56)=-2.78, *p*=.007(two tailed), in University1. The magnitude of differences of in the means was approximately large effect (eta squared=.12). On the contrary, there is no significant difference between the scores for freshmen pre-service ECE teachers (*M*=69.48 *SD*=7.32) and senior pre-service ECE teachers (*M*=69.03, *SD*=9.42); *t* (155) = .32, *p*=.74 (two tailed) in University2. Specifically, senior pre-service ECE teachers have higher attitude scores towards CBE in science activities than freshmen pre-service ECE teachers in University1.

Table 3: T-test result on year in program and attitude towards CBE in science activities

		F	Sig.	t	df	Sig. (2-tailed)
Total_attitude	Equal variances assumed	,996	,319	-,790	213	,430
	Equal variances not assumed			-,783	196,213	,434

Table 4: T-test result on year in program and attitude towards CBE in science activities in terms of university

			F	Sig.	t	df	Sig. (2-tailed)
University1	Total_attitude	Equal variances assumed	,124	,294	-2,784	56	,007*
		Equal variances not assumed			-2,825	55,718	,007
University2	Total_attitude	Equal variances assumed	1,476	,226	,329	155	,742
		Equal variances not assumed			,327	141,539	,744

*α=.05

Effects of Having Experience in Preschool on Pre-service ECE Teachers' Attitude towards CBE in Science Activities

According to t-test results, there is no significant difference in attitude scores towards CBE in science activities between pre-service ECE teachers who had practice in an early childhood institute (*M*=70.68, *SD*=8.56) and for those who did not (*M*=69.06, *SD*=7.17); *t* (213) = -1.47, *p*=.14 (two tailed). On the other hand, when it is examined in terms of university type, there is a significant difference in attitude scores towards CBE in science activities for pre-service ECE teachers who had practice in an early childhood institute (*M*=70, *SD*=5.62) and for those who did not (*M*=68.69, *SD*=6.75); *t* (56) = -3.24, *p*=.002 (two tailed) in University1. The magnitude of differences of in the means was large effect (eta squared=.15). On the contrary, there is no significant difference in attitude scores towards CBE in science activities for pre-service ECE teachers who had practice in an early childhood institute (*M*=69.33, *SD*=9.19) and for those who did not (*M*=69.18, *SD*=7.34); *t* (155) = -.11, *p*=.90 (two tailed) in University2. Specifically, pre-service ECE teachers who had practice in an early childhood institute have higher attitude scores towards CBE in science activities than pre-service ECE teachers who did not have practice in an early childhood institute in University1.

Table 5: T-test result on having experience and attitude towards CBE in science activities

		F	Sig.	t	df	Sig. (2-tailed)
Total_attitude	Equal variances assumed	,703	,403	-1,478	213	,141
	Equal variances not assumed			-1,511	211,759	,132

Table 6: T-test result on having experience and attitude towards CBE in science activities in terms of university

			F	Sig.	t	df	Sig. (2-tailed)
University1	Total_attitude	Equal variances assumed	1,162	,286	-3,245	56	,002*
		Equal variances not assumed			-3,123	41,086	,003
University2	Total_attitude	Equal variances assumed	1,226	,270	-,114	155	,909
		Equal variances not assumed			-,117	154,85	,907

*α=.05

Effects of Owing computer on Pre-service ECE Teachers' Attitude towards CBE in Science Activities

According to t-test results, it is found that there is no significant difference in attitude scores towards CBE in science activities between pre-service ECE teachers who have computer (*M*=70.27, *SD*=7.84) and those who have not computer (*M*=68.58, *SD*=8.75); *t*(211)= -1.15, *p*=.24 (two tailed).

Table 7: T-test result on having computer and attitude towards CBE in science activities

		F	Sig.	t	df	Sig. (2-tailed)
Total_attitude	Equal variances assumed	1,112	,293	-1,157	211	,248
	Equal variances not assumed			-1,076	47,105	,288

Effects of Frequency of Computer Usage on Pre-service ECE Teachers' Attitude towards CBE in Science Activities

According to descriptive statistics, of the 215 participants, 35.8% spend less than 1 hour, 49.3% spend 1-4 hours, 12.1% spend 4-7 hours, 1.9% spend 7-10 hours, and .9% spend more than 10 hours for using computer in a day. Specifically, it can be concluded that pre-service ECE teachers mostly spend 1-4 hours in a day with using computer. Moreover, when it was examined the relationship between duration of computer use that pre-service ECE teachers spend in a day and their attitudes toward CBE in science activities, it was conducted one way ANOVA and results show that there is no significant difference between the computer usage time and attitude towards CBE in science activities, *F*(4,210)=1.5, *p*=.19.

CONCLUSIONS

Overall the participants demonstrated positive attitudes towards computer based education while implementing science activities as shown by mean score 69.97 (minimum 37, maximum 87). This could be related with facilities and opportunities that are provided to the pre-service teachers at various stages of their education including before attending in teacher training program and experiences through university education. Additionally, it was resulted that gender, owing computer, frequency of computer usage did not have any effect on pre-service ECE teachers' attitudes towards using CBE while implementing science activities both in general and in terms of university type. This finding does not support to the past research that found meaningful difference between computer attitude and gender (Ray, Sormunen and Haris, 1999; Sadık, 2006; Yıldırım, 2000). However, some other studies stated that attitudes were not related with sexes (DeBlassioa & Bell, 1981; Deniz, 2007; Akbulut, 2008; Bebetsos & Antoniou, 2008) which supports the outcomes of this study. A possible reason of this finding can arise from common usage of computer in all areas from transactions to shopping that is attractive and useful for both female and male. Besides, the related literature about the effect of having computer on attitudes was examined and contradictory results were seen. For example, while some studies confirmed that there was a meaningful difference between computer ownership and attitudes toward computer (Khine, 2001; Taghavi, 2006; Akbulut, 2008), the others stated that there was no meaningful difference between computer ownership and attitudes toward computer (Deniz, 2005; Aral et al., 2006). Moreover, when the studies investigating the relationship between frequency of computer usage and attitudes were analyzed, some studies stated statistically significant effect (Kutluca, 2010; Tsitouridou & Vryzas, 2003). On the other hand, in the study of Gercek et al. (2006) a meaningful difference was not found between frequency of computer usage and attitudes toward computer. These can be derived from the accessibility and availability of computer resource in participants' environment. According to other result of this study, year in program and experience in preschool made a significant difference on attitudes towards using CBE while implementing science activities just only in terms of university type. Similarly, computer attitudes were affected from the variable of the year of study in most of the studies (Pamuk & Peker, 2009; Taghavi, 2006). These differences can arise from participants' self-evaluation about computer usage and freshmen students' not being taking courses about instructional technology, science and school experience in teacher education. In other words, it is found that there is a difference between participants' self evaluation about computer usage and their attitude score towards using CBE while implementing science activities not only in terms of university type but also grade level. Therefore, it should be given effective instructional technology courses in university education which support functional applications instead of general basic information. In addition, pre-service ECE teachers should be trained as how they can use computer and computer based applications in learning environment especially in science activities. Furthermore, universities could have clear vision which aims to graduate students as competence teachers for integrating technology in their classrooms. To achieve this aim, instructors could be given in-service training. Finally, there are some limitations of this study. For instance, the sample size is too small to generalize the results for Turkey and limited variables are analyzed in this study to determine their effect on attitude. To cover these limitations, a larger sample can be used and other variables can be added to examine their impacts on computer attitudes in future research. In order words, this study reflects the influence of selected variables on the computer attitudes of pre-service ECE teachers. Thus, future studies can investigate all perspectives of teacher education and their relationship between pre-service teachers' attitudes, acceptance, and usage of the computer as a tool for instructional purposes and professional development systematically.

REFERENCES

Akbulut, Y. (2008). Exploration of the attitudes of freshman foreign language students toward using computers at a Turkish state university. *The Turkish Online Journal of Educational Technology*, *7*(1), 18-31.

Aral, N., Ayhan, A. B., Unlu, O., Erdoğan, N., & Unal, N. (2006). Anaokulu ve anasınıfı öğretmenlerinin bilgisayara yönelik tutumlarının incelenmesi. *Elektronik Sosyal Bilimler Dergisi, 5*(17), 25-32.

Arslan, A. (2006). Bilgisayar destekli eğitim yapmaya ilişkin tutum ölçeği. *Yüzüncü Yıl Üniversitesi Eğitim Fakültesi Dergisi,3*(2), 24-33.

Asan, A. (2002). Fen ve sosyal alanlarda öğrenim gören öğretmen adaylarının bilgisayara yönelik tutumları. *Eğitim Araştırmaları Dergisi*,*7*(1), 136-146.

Bebetsos, E. , & Antoniou, P. (2008). University students' differences on attitudes towards computer use. Comparison with students' attitudes towards physical activity. *Interactive Educational Multimedia*,*17*, 20-28.

Birgin, O., Kutluca, T., & Çatlıoğlu, H. (2008). Sayısal ve sözel ağırlıklı bölümlerde öğrenim gören öğretmen adaylarının bilgisayara yönelik tutumlarının karşılaştırılması: KTU örneği. *Proceedings of 8th International Educational Technology Conference* (pp.874-878). Eskişehir: Nobel Yayın Dağıtım.

Brosnan, M. J., & Lee, W. (1998). A cross-cultural comparison of gender differences in computer attitudes and anxieties: The United Kingdom and Hong Kong. *Computers in Human Behavior, 14*(4), 559–577.

Clements, D.H. 1994. The uniqueness of the computer as a learning tool: Insights from research and practice. In *Young children: Active learners in a technological age*, eds. J.L. Wright & D.D. Shade, 31–50. Washington, DC: NAEYC

Comber, C., Colley, A., Hargreaves, D. J., & Dorn, L. (1997). The effects of age, gender and computer experience upon computer attitudes. *Educational Research, 39*(2), 123–133.

Çelik H.C.,& Bindak, R. (2005). İlköğretim okullarında görev yapan öğretmenlerin bilgisayara yönelik tutumlarının çeşitli değişkenlere göre incelenmesi. *İnönü Üniversitesi Eğitim Fakültesi Dergisi*, *6*(10), 27 38.

De Blassio, J. K. and Bell, F. H. (1981). Attitudes toward computers in high school mathematics courses. *International Journal of Mathematical Education in Science and Technology, 12* (1), 47-56.

Deniz, L. (2005). İlkoğretim okullarında görev yapan sınıf ve alan öğretmenlerinin bilgisayar tutumları. *The Turkish Online Journal of Educational Technology,4*(4),18-31.

Deniz, L. (2007). Prospective class teachers' computer experiences and computer attitudes. *International Journal of Social Sciences, 2* (2), 116-122.

Erkan S. (2004). Öğretmenlerin bilgisayara yönelik tutumları üzerine bir inceleme. *Manas Üniversitesi Sosyal Bilimler Dergisi*, 12,141-145.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. California: Addison-Wesley Publishing Company.

Gercek, C., Koseoğlu, P., Yılmaz, M., & Soran, H. (2006). Oğretmen adaylarının bilgisayar kullanımına yonelik tutumlarının ceşitli değişkenler acısından incelenmesi. *Hacettepe Universitesi Eğitim Fakultesi Dergisi, 30*, 130-139.

Gordin, D., & Pea, R.D. (1995). Prospects for scientific visualization as an educational technology. *The Journal of the Learning Sciences, 4*, 249-79.

Hartle, L. (2006). What do preschool teachers need to be successful with technology. In C. Crawford et al. (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference* (pp. 4251-4253). Chesapeake, VA: AACE.

Haugland, S.W. (1992).The effect of computer software on preschool children's developmental gains. *Journal of Computing in Childhood Education*, *3*(1)15–30.

Haugland, S.(2000).Computers and young children. (ERIC Documentation Service ED438926).

Khine, M. S. (2001). Attitudes toward computers among teacher education students in Brunei Darussalam. *International Journal of Instructional Media, 28*(2), 147-153.

Kulik, J. A. (1994). Meta-analytic studies of findings on computer-based instruction. *Technology Assessment in Education and Training*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Kutluca,T.(2011). A study on computer usage and attıtudes toward computers of prospective preschool teacher. *International Journal on New Trends in Education and Their Implications,2*(1), 1-17.

Kutluca, T., & Ekici, G.(2010). Öğretmen adaylarının bilgisayar destekli eğitime ilişkin tutum ve öz-yeterlilik algılarının incelenmesi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 38,*177-188.

Levine, T., & Donitsa-Schmidt, S. (1998). Computer use, confidence, attitudes, and knowledge: A causal analysis. *Computers in Human Behavior, 14*(1), 125–146.

Marina, S.T. (2001). Facing the challenges, getting the right way with distance learning. *Education at a Distance*, *15*(30), 1-8.
Mitra, A. (1998). Categories of computer use and their relationships with attitudes toward computers. *Journal of Research on Computing in Education, 30*(3), 281-294.
Molnar, A. S. (1997). Computers in education: A brief history. *The Journal Transforming Education Through Technology, 24,1-13.*
National Association for the Education of Young Children (1996).NAEYC position statement; technology and young children- ages three through eight. *Young Children*, *51*(6), 11-16.
Pamuk, S.,& Peker, D.(2009). Turkish pre-service science and mathematics teachers' computer related self-efficacies, attitudes, and the relationship between these variables. *Computers & Education, 53*, 454–461.
Ray, C. M., Sormunen, C., & Harris, T. M. (1999). Men's and women's attitudes toward computer technology: A comparison, *Office Systems. Research Journal, 17* (1), 1-8.
Ropp, M. M. (1999). Exploring individual characteristics associated with learning to use computers in pre-service teacher preparation. *Journal of Research on Computing in Education, 31*(4), 402–424.
Roussos, P. (2007). The Greek computer attitudes scale: Construction and assessment of psychometric properties. *Computers in Human Behavior, 23*(1), 578–590.
Rugayah, H., Hashim, H.,& Mustapha, W. N. (2004). Attitudes toward learning about and working with computers of students at UITM. *The Turkish Online Journal of Educational Technology, 3*(2), 3-7.
Sadık, A. (2006). Factors influencing teachers' attitudes toward personal use and school use of computers: New evidence from a developing nation. *Evaluation Review, 30*(1), 86-113.
Selwyn N. (1999) Students' attitudes towards computers in sixteen to nineteen education. *Education and Information Technologies, 4* (2), 129–141.
Shade, D.D. (1994).Computers and young children: Software types, social context, gender, age, and emotional responses. *Journal of Computing in Childhood Education*, 5(2):177–209.
Smith, B., Caputi, P.,& Rawstorne P. (2000). Differentiating computer experience and attitudes toward computers: An emprical investigation. *Computers in Human Behavior, 16*, 59-81.
Taghavi, S. E. (2006). The effects of age, access to a computer, and college status on computer attitudes. *Journal of Information Technology Impact, 6*(1), 1-8.
Teo, T.(2008). Pre-service teachers' attitudes towards computer use: A singapore survey. *Australasian Journal of Educational Technology*,*24*(4), 413-424.
Torkzadeh, G., & Van Dyke, T. P. (2002). Effects of training on Internet self-efficacy and computer user attitudes. *Computers in Human Behavior, 18*, 479–494.
Tsitouridou, M.,& Vryzas, K. (2003). Early childhood teachers' attitudes towards computer and information technology: The case of Greece. *Information Technology in Childhood Education Annual,1*, 187-207.
Vernadakis, N., Avegerinos, A., Tsitskari, E., & Zachopoulou, E. (2005).The use of computer assisted instruction in preschool education: Making teaching meaningful. *Early Childhood Education Journal, 33*(2), 99–104.
Williams, S. W., Ogletree, S. M., Woodburn, W., & Raffeld, P. (1993). Gender roles, computer attitudes, and dyadic computer interaction: Performance in college students. *Sex Roles, 29*(7/8), 515–525.
Yakın,I., & Sumuer, E.(2007). First year preservice teachers' attitudes toward computers from computer education and instructional technology department. (ERIC Documentation Service ED500174).
Yelland, N. (2006). Changing worlds and new curricula in the knowledge era. *Educational Media International, 43*(2), 121-131.
Yıldırım, S. (2000). Effects of an educational computing course on preservice and inservice teachers: A discussion and analysis of attitudes and use. *Journal of Research on Computing Education, 32*(4), 479-495.
Zhao, Y., Tan, H. S. & Mishra, P. (2001). Teaching and learning: Whose computer is it? *Journal of Adolescent & Adult Literacy*, *44*(4), 348-354.

MATH ATTITUDES OF COMPUTER EDUCATION AND INSTRUCTIONAL TECHNOLOGY STUDENTS

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ABSTRACT
Computer Education and Instructional Technology (CEIT) Departments train computer teachers to fill gap of computer instructor in all grades of schools in Turkey. Additionally graduates can also work as instructional technologist or software developer. The curriculum of CEIT departments includes mathematics courses. The aim of this study is to identify attitudes of undergraduate students at CEIT departments towards math. In order to investigate the research question quantitative methods was used. Specifically survey research was preferred. Mathematics Attitude Questionnaire (MAQ) that was developed by Duatepe and Çilesiz (1999) was used and the questionnaire includes 38 items. The instrument was conducted with 122 undergraduate students from CEIT departments of four different universities in Turkey in the spring semester of 2010- 2011. Data were analyzed through independent samples t-test and one-way ANOVA by means of PASW Statistics-18. In conclusion, some differences were found in terms of math attitudes of CEIT's students.
Keywords: CEIT Students, Computer Education, Math Attitudes, Math Courses.

INTRODUCTION

As it is known departments of Computer Education and Instructional Technologies (CEIT) were founded in 1998 by reconstructing education faculties in Turkey (Şahinkayası & Şahinkayası, 2004) and there are no departments like CEIT in the world except Turkey. The basic purposes of department of CEIT can be ordered as, for education foundations enhancing the methods and techniques which are essential for functional use of computer and instruction technologies' products, teaching and expanding these methods and techniques and training individuals who want to be teachers in these foundations.

Today, in Turkey the students who want to get training in the departments of CEIT must have YGS-1 scores. In YGS exam, math composes 40 % of the whole questions. The questions of math in this exam are based on elementary and first grade of high school curricula. Hence, undergraduate students who enrolled in the departments of CEIT may probably have no high levels of math knowledge. However at contents of courses in the departments of CEIT, there are intensive content of mathematics courses. For instance Math I course includes the topics such as, the concept of functions, the concept of limits, the concept of derivatives, equations of tangent and normal, curve sketching (YÖK, 2011).

In math education, the importance of attitude towards math is emphasized mostly. Attitude towards math has been researched for determining from the point of particular grade of students and different viewpoints (Tocci, 1991, Rounds & Hendel, 1980, Tabuk & Özdemir, 2010). According to Tezer and Karasel (2010), generally the relationship between attitude towards math and achievement in math is investigated and concluded that attitude towards math influences achievement in math.

A survey study was conducted by Köğce, Yıldız, Aydın and Altındağ (2009) with the purpose of determining and comparing the second grade elementary students' attitudes towards math. The researchers used the same instrument with this study but they adapted the scale for conducting to elementary students. They reached some statistically significant differences between attitude scores towards math and receiving private tuition at grade 6 and 7, math achievement score and educational background of parents, profession of fathers at grade 6 and 8, profession of mothers at grade 6 and lastly grade level of students in elementary schools. Additionally they did not find significant difference in terms of gender. Another study was applied to secondary school students by Yara (2009) and it was found that the students have positive attitudes towards math and they think that math is crucial and necessary for their future life.

Ma (1997) conducted a research which is related with reciprocal relationships between attitude towards math and achievement in math to approximately a thousand high school seniors. The researcher concluded that fathers have more effect in their children's achievement in math while mothers have more effect on their children's attitude towards math. Another result of this study is mothers who have lower education level have more effects on their children's awareness of importance of math so the researcher pointed out this may be a result of that mothers' feelings of deficiencies in terms of education and occupation. And the researcher added culture can affect the attitudes towards math more than the achievement in math in terms of children' parents' education level. Moreover it is found out; gender differences of students do not have an effect on the attitudes. According to Ma (1997); being a successful student at math does not mean that student have less concern about attitude towards math.

Sırmacı (2007) investigated the university students' anxiety and attitudes towards math. The researcher found that female students have more positive attitudes in terms of benefits of the perceived math and parents' attitudes towards math. And she did not find significant difference between attitudes towards math and the students' graduated schools from and the occupation of students' fathers.

According to Duatepe and Çilesiz (1999); it is seen that most of the undergraduate students who are unsuccessful at math for whom it is an obligatory course in the first year of curriculum of universities, have negative ideas about the math course. At the departments of CEIT content of courses requires substantial math content knowledge. However in a research, which was conducted with final-year students and graduates of the departments of CEIT, it was found that science and math courses are viewed as the least useful courses (Acat, Kılıç, Girmen & Anagün, 2007). At this point, according to a master thesis's result which is about the effect of the mathematical knowledge background of the computer education students to their undergraduate education, it is concluded that students who have more powerful math knowledge have more probability to be successful at CEIT departments (İşlek, 2007).

The main purpose of this study is to determine attitudes of undergraduate students at CEIT departments towards mathematics. The variables that can affect the students' attitudes towards mathematics were investigated in terms of gender, type of graduated high school, grade of high school diploma, YGS-1 score, which they received, their fathers' education level, their mothers' education level, grade of Information Technologies (IT) in Education I course and lastly grade of Mathematics I course.

METHOD

In the study descriptive model being one of the research methods, was used in order to determine the attitude of CEIT students towards math. Descriptive models are approaches that aim to describe an incident in the way it exists or used to exist. The incident that needs to be known exists and it is out there. The important issue is to observe it in an appropriate way and to detect it (Karasar, 2000). The data of the study were collected by means of "Math Attitude Scale" developed by Duatepe and Çilesiz (1999). The Cronbach's Alpha reliability coefficient of the original scale is 0.96. The reliability coefficient (Cronbach's Alpha) of the scale for this study was found to be 0.96 which is the same value with the original scale. The data were then analyzed and interpreted by means of PASW Statistics 18. In the analysis of data, independent sample t test was used in order to determine whether there is a significant difference among students' attitude towards math as regards their gender and their mothers' education levels. One way ANOVA was used in order to determine whether there is a significant difference among students' attitude towards math as regards their type of graduated high school, grade of high school diploma, YGS-1 score which they received, their fathers' education level, grade of IT in Education I course and lastly grade of Math I course. Reliability level is $p=0.05$.

The research problem was stated as "What are the attitudes towards math course of the first year undergraduate students at the departments of CEIT? This problem was examined by the sub-problems: Is there a statistically significant difference between total math attitude scores and respectively gender, type of graduated high school, grade of high school diploma, YGS-1 score, mother's education level, father's education level, grade of Information Technologies in Education I course, grade of Math I course?

Sample

The population of the study was faculty of educations which have CEIT Departments in Turkey. The sample of the study consisted of 122 CEIT students, who are taking or have taken Math I course at the CEIT Departments in four universities in Turkey. At this point the purpose was to encounter the students with math in recent time so; it was aimed to provide reflecting consistent and real answers in questionnaire about math attitude. The sample and the universities were randomly selected for the study. The participant students were reached via e-mail and they replied back through e-mails as voluntarily.

Table 1 shows that students' properties which are gender, type of graduated high school, grade of high school diploma, YGS-1 score which they got, their mothers' education level, their fathers' education level, grades of IT in Education I course and grades of Math I course.

As seen by Table 1, 47,5 % of the participants are male students (n= 58) and 52,5 % of the participants are female students (n=64). The majority of participant students who graduated from vocational high school are composed nearly the sample's half. The ratio of them is 48,4 % (n=59).It was also found out that 43,4 % (n=53) of the students' grades of high school diploma is in the interval of 4.51-5,00. Also it can be seen that from Table 1, 43,4 % (n=53) of the students' got from YGS-1 400-419 score. The students' mothers' education levels are mostly elementary education or illiterate. The ratio of them is 72,1 % (n=88). And the students' fathers' education levels are mostly elementary education or illiterate, the ratio of them is 44,3 % (n=54). 40,2 % (n=49) of the students got BB- BA from Information Technology in Education I course. The students' 30,3 % (n=37) got CC- CB from Math I course.

To decide whether conducting parametric or nonparametric tests, Kolmogrov Smirnov test and test of homogeneity of variances in ANOVA were conducted. At the end of these analysis since it was reached the value of p>0,05, it was decided that the data had normal distribution and were homogeneous. Thus parametric tests were conducted to the data.

Table 1. Demographic properties of students that took part in the study

	Property	*f*	*%*		*Property*	*F*	*%*
Gender	Male	58	47,5	Type of Graduated (High school)	General high school	38	31,1
					Vocational high school	59	48,4
	Female	64	52,5		Anatolian high school	25	20,5
Diploma Grade (High School)	4,00 and below	29	23,8	YGS-1 Score	400- 419	53	43,4
	4,01-4,50	40	32,8		420- 439	28	23,0
	4,51-5,00	53	43,4		440-+	41	33,6
Mother' Education Level	Illiterate and Elementary Education	88	72,1	Father' Education Level	Illiterate and Elementary Education	54	44,3
					Secondary Education	37	30,3
	Secondary Education and above	34	27,9		College and above	31	25,4
IT in Education I Grade (Course)	AA	20	16,4	Math I Grade (Course)	BB-BA and above	30	24,6
	BB-BA	49	40,2		CC-CB	37	30,3
	CC-CB	24	19,7		DD-DC	20	16,4
	DD-DC and below	29	23,8		FF-FD	35	28,7

Data collection
CEIT students' math attitudes were determined by "Math Attitude Scale" developed by Duatepe and Çilesiz (1999) and personal information was collected by "Personal Information Survey". In the math attitude scale there are 38 items; of which 22 are negative and 16 are positive; in 4 factors. These factors are "like and interest, anxiety and confidence, occupational and daily importance, enjoyment".

Findings
Below there is a summary of the findings from the study and some remarks on them. In the study the attitude of students towards math was analyzed statistically according to their gender by an independent sample t test. The results are given in Table 2.

Table 2. Independent sample t test analysis results according to gender*

	Gender	*n*	$\sum X$	*SD*	*Levene Test*		*Df*	*t*	*p*
					F	*p*			
Total math attitude score	Female	58	137,88	28,52	3,276	0,073	120	3,465	0,001
	Male	64	118,39	33,13					

It was seen from Table 2 that female students ($\sum X$=137,87) have more positive attitude than male students ($\sum X$ =118,39) towards math. The relation between the total math attitude score of the students and their gender was analyzed and it was seen that there is a significant difference ($t_{(120)}$=3,465; p< 0,05). This result showed that there is a significant difference between the gender and the total math attitude score in favor of female students.

It was aimed to analyze the attitude of students towards math as regards the type of graduated high school, and one way ANOVA was conducted. The results are given in Table 3.

Table 3. One way ANOVA for the attitude as regards type of graduated high school*

	Graduated High School Type	***n***	***∑X***	***SD***	***Source of variance***	***Sum of Squares***	***Df***	***F***	***p***
Total math attitude score	General High School	38	138,45	26,34	Between groups	19475,08	2	10,77	0,00
	Vocational High School	59	114,66	32,54					
	Anatolian High School	25	141,92	29,22	Within group	107604,46	119		

When Table 3 was analyzed, it was seen that the total attitude scores towards math is the highest ($\sum X$ = 141,92) for the students, who graduated from Anatolian high school. There is a significant difference between type of graduated high school and the total attitude scores towards math ($F_{(2,119)}$= 10,77; p < 0,05). In order to find out among which group this difference results from, Scheffe analysis in ANOVA was applied. It was understood that the total math attitude scores for general high school ($\sum X$= 138,45) is significantly different from vocational high school ($\sum X$ = 114,66) and the total math attitude scores for Anatolian high school ($\sum X$= 141,92) is significantly different from vocational high school ($\sum X$ = 114,66). The students who graduated from Anatolian high school and general high school have more positive attitude towards math separately compared with the students who graduated from vocational high school.

It was aimed to analyze the attitude of students towards math as regards grades of high school diploma. For this analysis one way ANOVA was conducted to the data and the results are given in Table 4.

Table 4. One way ANOVA for attitude as regards grades of high school diploma variable*

	High School Diploma Grades	***n***	***∑X***	***SD***	***Source of variance***	***Sum of squares***	***Df***	***F***	***p***
Total Math attitude score	4,00 and below	29	123,58	38,00	Between groups	1810,06	2	0,86	0,426
	4,01-4,50	40	133,03	30,88					
	4,51-5,00	53	125,83	30,27	Within group	125269,48	119		

When Table 4 was analyzed, it can be seen that the total attitude scores towards math is the highest ($\sum X$ = 133,03) for the students whose grades of high school diploma is in the interval of 4,01- 4,50. There is no statistically significant difference between grades of high school diploma and the total attitude scores towards math ($F_{(2,119)}$= 0,86; p > 0,05).

The attitude of students towards math was analyzed as regards YGS-1 score which they got. For this analysis one way ANOVA was applied to the data and the results are given in Table 5.

Table 5. One way ANOVA for the attitude as regards YGS-1 score variable*

	YGS-1 Score	***N***	***∑X***	***SD***	***Source of variance***	***Sum of Squares***	***Df***	***F***	***p***
Total Math attitude score	400- 419	53	127,00	29,90	Between groups	8068,08	2	4,034	0,020
	420- 439	28	115,11	38,88					
	440 +	41	137,07	28,14	Within group	119011,46	119		

When Table 5 was analyzed, it was seen that the total attitude scores towards math is the highest ($\sum X$ = 137,07) for the students, who got 440 and above from YGS-1. There is a significant difference between grades of YGS-1 score and the total attitude scores towards math ($F_{(2,119)}$= 4,034; p < 0,05). In order to find out among which group this difference results from, Scheffe analysis was applied in ANOVA. It was understood that the total math attitude scores for the students who got 420-439 from YGS-1 ($\sum X$ =115,11) is significantly different from the students who got 440 and above from YGS-1 ($\sum X$ = 137,07). The students who got 440 and above from YGS-1, have more positive attitude towards math than the students who got 420- 439 from YGS-1.

In the study it was also aimed to analyze the attitude of students towards math as regards their mothers' education level. For this analysis independent sample t-test was conducted to the data and the results are given in Table 6.

Table 6. Independent sample t test analysis results according to mothers' education level variable*

	Mothers' education level	*n*	*∑X*	*SD*	*Levene Test F*	*Levene Test p*	*Df*	*t*	*p*
Total math attitude score	Illiterate and Elementary Education	88	129,38	31,64	0,072	0,79	120	0,942	0,348
	Secondary Education and Above	34	123,21	34,40					

When Table 6 was analyzed, it can be seen that the students whose mother' education levels are elementary education or illiterate ($\sum X$ =129,38) have more positive attitude than the students whose mother' education levels are secondary education and above ($\sum X$=123,21). The relation between the total math attitude score of the students and their mothers' education levels was analyzed and it was seen that there is no significant difference ($t_{(120)}$=0,942; p> 0,05). This result shows that there is no significant relation between the students' mothers' education levels and the total math attitude scores.

In the study the attitude of students towards math was analyzed as regards their fathers' education level. For this analysis one way ANOVA was applied to the data and the results are given in Table 7.

Table 7. One way ANOVA for the attitude as regards their fathers' education level variable*

	Fathers' education level	*n*	*∑X*	*SD*	*Source of variance*	*Sum of squares*	*Df*	*F*	*p*
Total Math attitude score	Illiterate and Elementary Education	54	121,07	33,43	Between groups	6648,36	2	3,285	0,041
	Secondary Education	37	138,38	32,58					
	College and above	31	126,32	25,42	Within group	120431,18	119		

When Table 7 was analyzed, it can be seen that the total attitude scores towards math is the highest ($\sum X$ = 138,38) for the students whose father' education levels are secondary education. There is a significant difference between the students' fathers' education levels and the total attitude scores towards math ($F_{(2,119)}$= 3,285; p < 0,05). In order to find out among which group this difference results from, Scheffe analysis in ANOVA was applied. It is understood that the total math attitude scores for the students whose fathers' education levels are elementary school or illiterate ($\sum X$= 121,07) is significantly different from the students whose fathers' education levels are secondary education ($\sum X$ = 138,38). The students whose fathers' education levels are secondary education have more positive attitude towards math than the students whose fathers' education levels are elementary school or illiterate.

In the study it was also aimed to analyze the attitude of students towards math as regards students' grades of IT in Education I course. For this analysis one way ANOVA was conducted to the data and the results are given in Table 8.

Table 8. One way ANOVA for the attitude as regards grades of IT in Education I course variable*

	IT in Education-I Course Grade	*n*	*∑X*	*SD*	*Source of variance*	*Sum of Squares*	*Df*	*F*	*p*
Total Math attitude score	AA	20	123,40	36,19	Between groups	1763,09	3	0,553	0,647
	BB-BA	49	126,86	29,42					
	CC-CB	24	125,04	37,68					
	DD-DC and below	29	134,10	30,60	Within group	125316,45	118		

When Table 8 is analyzed, it was seen that the total attitude scores towards math is the highest ($\sum X$= 134,10) for the students whose grades of IT in Education I course are DD- DC or below. There is no statistically significant difference between the students' grades of IT in Education I course and the total attitude scores towards math ($F_{(3,118)}$= 0,553; p > 0,05).

Lastly in the study it was also aimed to analyze the attitude of students towards math as regards students' course grades of Math I. For this analysis one way ANOVA was conducted to the data and the results are given in Table 9.

Table 9. One way ANOVA for the attitude as regards grades of Math I variable*

	Math-I Course Grade	*n*	*∑X*	*SD*	*Source of variance*	*Sum of Squares*	*Df*	*F*	*P*
Total Math attitude score	BB-BA and above	30	142,27	27,73	Between groups	15859,23	3	5,609	0,001
	CC-CB	37	133,22	31,58					
	DD-DC	20	111,00	38,25	Within group	111220,31	118		
	FF-FD	35	118,77	27,24					

When Table 9 was analyzed, it was seen that the total attitude scores towards math is the highest ($\sum X = 142{,}27$) for the students whose grades of Math I course are BB- BA or above. There is a statistically significant difference between the students' grades of Math I course and the total attitude scores towards math ($F_{(3,118)}= 5{,}609$; $p < 0{,}05$). In order to find out among which group this difference results from, Scheffe analysis in ANOVA was applied. It is understood that the total math attitude score for the students who got BB- BA ($\sum X = 142{,}27$) or above from Math I course is significantly different from the students who got DD- DC ($\sum X = 111{,}00$) and FF- FD ($\sum X = 118{,}77$) from Math I course. The students who got BB- BA or above from Math I course have more positive attitude towards math than the students who got DD- DC and FF- FD from Math I.

DISCUSSIONS AND CONCLUSIONS

This study was conducted by the idea of computer science is a field that requires the ability of analytic thinking and in respect of CEIT departments' extent, it is important to determine students' attitudes towards math. The obtained results can be summarized as below.

It was found that there is a significant difference between the gender and the total math attitude score in favor of female students. Although Ma (1997)'s, Farooq and Shah (2008)'s, Köğce, et al. (2009)'s and Uşun and Gökçen (2010)'s studies reached the result that indicated gender of the students do not affect their attitudes towards math, this study found that female students have more positive attitudes towards math than male students. Yenilmez (2007)'s research result supported this result.

According to type of graduated high school a significant difference is found in terms of total math attitude scores. It was understood that the students who graduated from Anatolian high school and general high school have more positive attitude towards math separately compared with the students who graduated from vocational high school. However Sırmacı (2007)'s study stated that students who have anxiety towards math have negative attitude towards math and the study concluded that there is no significant difference between the type of graduated high school and anxiety towards math.

Another result was that students whose grades of high school diploma are in the interval of 4,01- 4,50 have more positive attitude towards math. There is no statistically significant difference between grades of high school diploma and the total attitude scores towards math.

In the study it was concluded that there is a significant difference between grades of YGS-1 score and the total attitude scores towards math. The students who got 440 and above from YGS-1, have more positive attitude towards math than the students who got 420- 439 from YGS-1. When it was considered math questions consist of 40 % of YGS-1 exam, this result is not surprising.

The students whose mothers' education levels are elementary education and illiterate, have more positive attitude than the students whose mother' education levels are secondary education and above and there is no significant difference between the students' mothers' education levels and the total math attitude scores. Yenilmez (2007) in his study did not find a significant difference between attitude towards math and mothers' and fathers' education level. However in this study there is a significant difference between the students' fathers' education levels and the total attitude scores towards math. The students whose fathers' education levels are secondary education have more positive attitude towards math than the students whose fathers' education levels are elementary school or illiterate. On the other hand according to Ma (1997)'s study; fathers affect students' math achievement while mothers affect children's attitude towards math.

There is no significant difference between attitude and grades of Information Technologies in Education I course. It was found that the total attitude scores towards math is the highest for the students whose grades of IT in Education I course are DD- DC or below, this seems interesting.

Lastly in the study the attitude of students towards math was analyzed as regards students' course grades of Math I. It can be said that the students whose grades of Math-I course are BB- BA or above have more positive attitude towards math. It is an expected result.

Besides all these results, it was thought that the students who are enrolled the CEIT departments with YGS-I, encounters with Math-2 courses subjects primarily so this situation can cause the students have negative attitudes towards math.

Another important result was that students, who are successful at Information Technology in Education I course, are mostly graduated from vocational high schools and they have less positive attitudes towards math.

Reforming of the CEIT Departments' curricula in terms of math attitudes of the students is essential. Students of the departments should have the ability of analytical thinking and this ability should be existing either prior to the beginning of the studies (at the high school level) or should be given to the departments students by means of academic preparation year at the university. The results of the study are expected to illuminate the discussions in this area.

REFERENCES

Acat, M.B., Kılıç, A.K., Girmen, P. & Anagün, Ş. S., (2007). The necessity and applicability levels of the courses that are offered in the departments of CEIT, *The Turkish Online Journal of Educational Technology*, 6(3), p.12.

Duatepe, A. & Çilesiz, Ş., (1999). Matematik tutum ölçeği geliştirilmesi, *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi,* 16-17, p.51.

Farooq, M. S. & Shah, S. Z., (2008). Students' attitudes towards mathematics, *Pakistan Economic and Social Review,* 46(1), p.79.

İşlek, H. (2007*). Bilgisayar eğitimi bölümü öğrencilerinin matematiksel alt yapılarının lisans eğitimleri üzerine etkisi*. Yüksek Lisans Tezi, Gazi Üniversitesi/Bilişim Enstitüsü, Ankara. p.37.

Karasar, N. (2000). *Bilimsel Araştırma Yöntemi- Kavramlar, İlkeler, Teknikler*. Nobel Yayınevi. p.77.

Köğce, D., Yıldız, C., Aydın, M. & Altındağ, R., (2009). Examining Elementary School Students' Attitudes towards Mathematics in Terms of Some Variables, *Procedia Social and Behavioral Sciences*, 1, p.294.

Ma, X. (1997). Reciprocal Relationships between Attitudes towards Mathematics and Achievement in Mathematics, *The Journal of Educational Research*, 90(4), p.226, 227.

Rounds, J.B. & Hendel, D., (1980). Mathematics Anxiety and Attitudes toward Mathematics*, Measurement and Evaluation in Guidance,* 13 (2), p.83.

Sırmacı, N. (2007). Üniversite Öğrencilerinin Matematiğe Karşı Kaygı ve Tutumlarının İncelenmesi: Erzurum Örneği, *Eğitim ve Bilim,* 32 (145), p.67, 68.

Şahinkayası,H. & Şahinkayası,Y., (2004). Bilgisayar ve Öğretim Teknolojileri Eğitimi (BÖTE) Bölümü Lisans Programında Bulunan "Öğretim Teknolojileri ve Materyal Geliştirme" Dersinin Analizi. *XIII. Ulusal Eğitim Bilimleri Kurultayı,* İnönü Üniversitesi, Eğitim Fakültesi, Malatya. p.1, retrieved 15.05.2011 from http://www.pegema.net/dosya/dokuman/439.pdf

Tabuk, M. & Özdemir, A. Ş. (2010). Proje Tabanlı Öğrenmede Çoklu Zekâ Yaklaşımının Öğrencilerin Matematiğe Karşı Tutumlarına Etkisi. *E-Journal of New World Sciences Academy*, 5 (3), p.675.

Tezer, M. & Karasel, N. (2010). Attitudes of primary school 2nd and 3rd grade students towards mathematics course, *Procedia Social and Behavioral Sciences,* 2, p.5809.

Tocci, C. M. (1991). Achievement, Parental, Support, and Gender Differences in Attitudes toward Mathematics, *Journal of Educational Research,* 84 (5), p.280.

Uşun, S. & Gökçen, E., (2010). The Effect of Activity Based Instruction Approach on Students' Attitudes towards the Mathematics Lesson in the Second Grade of Primary School. *International Online Journal of Educational Sciences,* 2 (2), p.554.

Yara, P. O. (2009). Student's Attitude towards Mathematics and Academic Achievement in Some Selected Secondary Schools in Southwestern Nigeria, *European Journal of Scientific Research,* 36 (3), p.339.

Yenilmez, K. (2007). İlköğretim Öğrencilerinin Matematik Dersine Yönelik Tutumları, *Ondokuz Mayıs Üniversitesi Eğitim Fakültesi Dergisi,* 23, p.55, 57.

YÖK, (2011). *Bilgisayar ve Öğretim Teknolojileri Eğitimi Lisans Programı*, p.2, retrieved 15.05.2011 from: http://www.yok.gov.tr/component/option,com_docman/task,cat_view/gid,134/Itemid,99999999/

PERCEPTIONS OF PRESERVICE TEACHERS REGARDING THE INTEGRATION OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN TURKISH EDUCATION FACULTIES

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ABSTRACT
This study explored the views of pre-service teachers regarding the indicators of information and communication technologies (ICT) at Turkish education faculties. A cross-sectional survey design was implemented with graduating students enrolled in Turkish education faculties. A combination of stratified random sampling and systematic sampling was implemented. Turkish education faculties were subdivided into six groups based upon the knowledge of how each institution stood relative to selected stratifying variables, and a sample was drawn from each group randomly. The data collection tool was administered to 2515 graduating students at those education faculties. It was found that participants criticized the current situation of ICT indicators in their institutions. Perceptions differed with regard to different departments, gender and frequency of ICT use for instructional purposes whereas they did not vary with regard to income, PC experience, and having a PC at home. Implications and suggestions for further research were provided.
Keywords: ICT integration; teacher training; higher education

INTRODUCTION

Skills regarding information and communication technologies (ICTs) have gained incremental importance for education, employment and communication in recent years. ICTs have become significant tools to access information, educate individuals and conduct interactive instructional activities regardless of time and location (Mobbs, 2002). According to the final report of the World Summit on the Information Society (WSIS, 2003), which was signed by 175 countries, it was recommended that developing countries should be supported to make progress in access to ICTs and distance learning opportunities at a lower cost, so that all individuals pursue a sustainable progress to create an information society. Such comprehensive decisions stem from the research findings maintaining that organizations with high-level ICT integration have incremental productivity (Campbell, 2001). ICTs are considered to provide a more creative, innovative, entertaining and colorful atmosphere in comparison to face-to-face instructional endeavors. In this regard, the need to equip individuals with skills to use ICTs effectively and responsibly presents an enormous challenge to educators, since they are supposed to provide learners with relevant, up-to-date and high-quality technology experience before learners emerge into the employment world (Gibson, O'Reilly, & Hughes, 2002).

ICTs are dynamic in nature, so are the skills regarding ICT use. UNESCO (2002) lists four competencies regarding ICT integration in teacher training as (1) Content and Pedagogy, (2) Collaboration and Networking, (3) Technical Issues, and (4) Social Issues. Akbulut, Kesim and Odabaşı (2007) scrutinize the subtitles of each competency through the help of the Odabaşı et al. (2006) study. More specifically, *Content and Pedagogy* indicators involve (a) Teaching-Learning Methods and (b) ICT in the Curriculum; *Collaboration and Networking* indicators involve (a) Professional Development and (b) Learning Communities; *Social Issues* involve (a) Health, (b) Ethics, (c) Policies, and (d) Special Needs; and finally *Technical Issues* involve (a) Infrastructure, (b) Ease of Use, (c) Access, and (d) Technical Assistance. A detailed description of each competency may be found in UNESCO (2002) and sub-competencies can be examined in Akbulut et al. (2007). As a follow-up research, Akbulut (2009) purported to improve the measurement tool provided by Akbulut et al. (2007), added 34 new items to the data collection tool, and addressed the indicators of ICT integration at tertiary education. An exploratory factor analysis on 75 items eliminated 14 questions, extracted 11 factors explaining 64 percent of the total variance with a very high internal consistency coefficient (α=.96). Extracted factors were named as E-learning, Infrastructure, Teaching-Learning Methods, Policy, Special Education, Health, Learning

Communities, Ease of Use, E-interaction, Technical Assistance and Access. The current study primarily focused on those factors and investigated whether they vary according to several background variables.

There have been studies focusing on different aspects of ICT integration in primary and secondary schools (El-Tigi, 2000; Eteokleous, 2004; Isikoglu, 2002; Kahveci, Şahin & Genç; 2011; McRae, 2001; Pompeo, 2004). There have also been studies regarding the use of ICTs by pre-service teachers and instructors of teacher training institutions (Shafiei, 2005; Toledo, 2005). However, the focus on the ICT use profiles of prospective teachers is satisfactory and well reported (e.g. Akpınar, 2003; Demiraslan & Usluel, 2005; Şahin, 2011) whereas organizational level models and analyses are slightly unconsidered except for some recent promising models (e.g. Akbulut, 2010; Aşkar, Usluel & Mumcu, 2006; Usluel, Aşkar & Baş, 2008; Yücel, Acun, Tarman & Mete, 2011). In addition, comprehensive investigations were robust and informatory in K-12 settings as meticulously done in several recent studies (Akbaba-Altun, 2006; Aypay, 2010; Özdemir & Kılıç, 2007), but insufficient in higher education settings. In this regard, the current situation of educational bodies regarding ICT integration should be scrutinized better (ETS, 2007).

Several studies have been conducted addressing the ICT integration process along with those addressing the problems confronted during integration endeavors. According to a comprehensive search we conducted recently, in the last decade, the number of publications on the use of computers in education was above 4600 and the number of those on computer based instruction was 3600, whereas relatively few studies were published on organizational ICT integration. To exemplify, El-Tigi (2000) administered a 60-item questionnaire along with open-ended questions to 142 undergraduate students. It was revealed that insufficient motivation, infrastructure, PC skills and time constraints prevented participants from implementing ICT tools whereas positive guidance, quality content, rich materials, ease of access and ease of communication facilitated ICT use. Smith and Robinson (2003) provided a new perspective for technology integration into curriculum, and suggested that collaborative cohorts might be used for successful integration, which could be evaluated within the framework of collaboration and networking in the current study. Pompeo (2004) described successful ICT integration endeavors and identified factors necessitating ICT integration. Four educational institutions with above-average ICT infrastructure were investigated through qualitative methods. Findings suggested that resources to sustain powerful infrastructure carried utmost importance for successful integration. It was also indicated that initial steps should be taken by the institution before ideal integration endeavors were realized. Among these steps were administrative policies and responsibilities, development of infrastructure, communication within the organization, and arrangements in the curriculum to address current needs. In addition, constant professional and technical developments of instructors were reported to carry importance.

Recent studies addressing teacher perspectives on integrating ICTs into instruction (Toledo, 2005) and on teachers' integration of ICTs into classroom practice (Hennessy, Ruthven, & Brindley, 2005) implied that teachers needed to develop new strategies for mediating ICT supported activities. After examining ICT use approaches found in teacher training, Jung (2005) suggested that ICTs could change the ways teachers teach. If such a transformation in teaching and learning endeavors was not realized, pre-service teachers might not find sufficient opportunities to experience ideal ICT implementations for instructional purposes. This argument was supported by Barton and Haydn (2006) indicating that pre-service teachers were influenced by their role models. More specifically, modeling of ICT by the mentor was considered vital. Similarly, Mueller, Wood, Willoughby, Ross and Specht (2008) indicated that positive learning experiences with ICTs had an impact on successful integration. In addition to positive experiences, significant variables influencing integration included teacher's comfort with computers; beliefs supporting the use of computers as an instructional tool; training; motivation; support; and teaching efficacy.

Poor classroom environments and lack of or limited availability of equipment to realize ICT-integrated lessons were reported as significant barriers to ICT integration in many studies (Akbaba-Altun, 2006; Brill & Galloway, 2007; Clarke, 2007; Göktaş, Yıldırım & Yıldırım, 2008; Odabaşı, 2000; Ololube, 2006). Infrastructure is primarily an administrative problem. Strong infrastructure should be followed by equal access opportunities for all, precautions to facilitate ease of use, and employment of technical staff to assist users. Still, the habit of integrating ICTs into classrooms by transforming old-fashioned teaching endeavors to new technology settings, and ignoring the unique contributions of ICTs were reported as common problems (Knight, Knight, & Teghe, 2006). Instructors mostly deal with their publications rather than quality instruction - an issue which is not supported through tangible awards in Turkey sufficiently. In this regard, rewarding quality instruction through ICTs might be a plausible solution for effective integration as indicated in several recent studies (Brill & Galloway, 2007; Del Favero & Hinson, 2007; Liu & Huang, 2005). In addition, developing communities of practice among the participants of the integration process can facilitate both ICT integration and professional development endeavors (Hodgkinson-Williams, Slay, & Siebörger, 2008).

Fortunately, there have been studies in Turkey addressing social issues of ICT integration including *health* (Odabaşı & Erişti, 2008), *ethics* (Akbulut, Odabaşı, & Kuzu, 2008a; Akbulut, Şendağ, Birinci, Kılıçer, Şahin & Odabaşı, 2008b; Akbulut, Uysal, Odabaşı & Kuzu, 2008c; Akbulut, Şahin & Erişti, 2010), *special education* (Girgin, Kıyıcı & Tanyeri, 2008; Odabaşı, Çuhadar & Kuzu, 2008) and *policy issues* (Akbaba-Altun, 2006). The primary purpose of the current study was to investigate the current situations of Turkish education faculties with regard to the indicators of ICT integration through pre-service teachers' viewpoints. In addition, pre-service teachers' perceptions regarding the ICT integration level of their education faculties were also investigated with regard to several background variables determined according to recent studies (Akbulut et al., 2008c; Alampay, 2006; Campbell, 2001; Hartley, 2007; Hohlfeld, Ritzhaupt, Baron & Kemker, 2008; Ilomaki & Rantanen, 2007; Rodríguez, 2006; Underwood & Szabo, 2003; Vekiri & Chronaki, 2008; Wainer et al., 2008) which were gender, department, family income, PC experience, having a PC at home, and frequency of ICT use for instructional purposes.

METHODS AND PROCEDURES

Sampling

The study resorted to a cross-sectional survey design whose population consisted of pre-service teachers enrolled in Turkish education faculties. Turkish universities showed a heterogeneous distribution in terms of the degree of academic achievement and infrastructure. In this regard simple random sampling was considered ineffective. A combination of stratified random sampling and systematic sampling was applied. To reduce the possibility that the sample might turn out to be unrepresentative of the population, the education faculty population was first described and listed according to some quality criteria (e.g. number of students per instructor, number of indexed articles per instructor, university entrance exam ranks, etc.). Then, the list was subdivided into six parts based upon the knowledge of how each faculty stood relative to stratifying variables, and a sample was drawn randomly from each part consisting of six education faculties.

Of 5371 last year education faculty students in these six universities, 2627 participants voluntarily participated in the study which constituted a response rate of 49 percent. However, 112 questionnaires (4 %) were eliminated since those participants filled in the questionnaire with a monotonous pattern (e.g. marking all items as 5 or 1), or left at least half of the items empty, or filled in their personal information form but left other items empty. After this elimination, the number of valid questionnaires was 2515 (47 %). Of these participants, 1595 (63.4 %) were females and 881 (35 %) were males whereas 39 (1.6 %) did not indicate their genders.

Data Collection and Analysis

A personal information form and 75 items were administered to graduating students at six education faculties. Items were developed through extensive literature review, focus group interviews with ICT instructors and PhD students, expert panels with scholars in the field and pilot implementations. Items were rated according to a five-point scale. Scale development processes were reported in Akbulut (2009), who eliminated 14 dysfunctional items through exploratory factor analysis. The final scale included 11 factors sheltering 61 items, which explained 64 percent of the total variance. The internal consistency coefficient of the tool was 0.96. Name of the factors and internal consistency coefficients were as follows: E-learning (α=.93), Infrastructure (α=.89), Teaching-learning Methods (α=.86), Policy (α=.89), Special Education (α=.88), Health (α=.87), Learning Communities (α=.83), Ease of Use (α=.88), E-interaction (α=.85), Technical Assistance (α=.84), and Access (α=.78).

Exploratory and confirmatory factor analyses on the data were reported by Akbulut (2009). Descriptive statistics and parametric comparisons among the levels of background variables were reported in the current study. Descriptive values regarding each indicator were given, and these values were compared with the neutral value (i.e. 3 out of 5) through one-sample t-tests. Comparisons regarding background variables with more than two levels were conducted through one-way between-groups ANOVAs, whereas comparisons regarding dichotomous variables like gender and having a PC at home were conducted through independent-samples t-tests. The relationship between participant scores on the current scale and PC experience was examined through correlation coefficients.

RESULTS

The overall evaluation

First, descriptive statistics regarding each indicator were calculated. The mean of the whole scale was 2.16 (SD= 0.57). None of the factor means was close to the medium value (i.e.3). One-sample t-tests revealed that all factors and the average of all questions were significantly lower than a medium value of 3 at a probability value below 0.001. Sorting factors from the highest through the lowest provided the following order: Learning

Communities ($\bar{X}$=2.79; SD=0.8), Teaching-learning methods ($\bar{X}$=2.78; SD=0.76), Health ($\bar{X}$=2.75; SD=0.89), Access ($\bar{X}$=2.26; SD=0.91), Infrastructure ($\bar{X}$=2.16; SD=0.86), Technical Assistance ($\bar{X}$=2.09; SD=0.9), E-learning ($\bar{X}$=2.02; SD=0.92), E-interaction ($\bar{X}$=1.89; SD=0.88), Policy ($\bar{X}$=1.78; SD=0.76), Ease of Use ($\bar{X}$=1.76; SD=0.83) and Special Education ($\bar{X}$=1.45; SD=0.68).

Gender

After the exclusion of 39 participants (1.6 %) who did not indicate their genders, 881 male and 1595 female participants were compared in terms of the average score. Independent-samples t-test revealed that average of males' evaluations regarding ICT indicators ($\bar{X}$=2.21; SD=0.6) was significantly higher than that of females ($\bar{X}$=2.13; SD=0.55) at a statistically significant level ($p<0.001$). Further comparisons for each indicator revealed that males' evaluations were significantly more positive than those of females in terms of E-learning, Policy, Special Education and Technical Assistance. Females' evaluations were more positive in terms of Learning Communities. Other indicators did not differ between males and females. All significant differences were at a probability value below 0.01.

Department

Participants' average values on the scale with regard to their departments were examined through a one-way ANOVA. Descriptive statistics are provided in Table 1.

Table 1. Descriptive statistics of each department

Department	Science and mathematics	Social sciences	Turkish language	Foreign languages	Computer sciences	Educational sciences	Fine arts	Primary education	Pre-school education	Total
n	601	290	306	366	154	92	43	515	139	2506
$\bar{X}$	2,23	2,24	2,01	2,09	2,37	2,02	1,91	2,10	2,33	2,16
SD	0,55	0,64	0,50	0,53	0,57	0,47	0,66	0,58	0,60	0,57

As shown in the table, departments of fine arts education, educational sciences and Turkish language education had the lowest means. To see whether the differences among departments were statistically significant, a one-way ANOVA was conducted, which revealed an F value of 12.63 with a corresponding significance below 0.001. Since the homogeneity of variance assumption was not met, multiple comparisons were conducted through Tamhane's T2. Mean differences are provided and significant differences are marked in Table 2. As indicated in the table, departments of computer science education and preschool education had significantly higher means than the departments of Turkish language education, foreign languages education, educational sciences, fine arts education and primary school education. Science and mathematics education had higher means than Turkish language education, foreign languages education, educational sciences and primary education. Social science education had higher means than Turkish language education, foreign languages education, and educational sciences. In brief, departments of Turkish language education, educational sciences and fine arts education had lower means which created significant differences in multiple comparisons.

Table 2. Multiple comparisons and mean differences among departments

Group	Science and mathematics (A)	Social sciences (B)	Turkish language (C)	Foreign languages (D)	Computer sciences (E)	Educational sciences (F)	Fine arts (G)	Primary education (H)	Pre-school education (I)
A	-	-0,01	0,23***	0,14**	-0,14	0,21**	0,32	0,13**	-0,1
B			0,24***	0,15*	-0,13	0,23**	0,34	0,14	-0,08
C				-0,09	-0,37***	0,01	0,1	-0,09	-0,33***
D					-0,28***	0,08	0,102	-0,18	-0,24***
E						0,36***	0,47***	0,28***	0,04
F							0,11	-0,08	-0,32***
G								-0,19	-0,42*
H									-0,23**

p < * .05 ** .01 *** .001

Family Income

Of 2515 participants, 53 (2 %) did not indicate their family income. About 45 percent of the participants earned 400 to 800 USD per month; 25 percent earned 801 to 1200 USD; 9 percent earned 1201 to 1600 USD. Seven percent earned higher than 1600 dollars whereas 12 percent earned lower than 400 dollars per month. To compare different family income groups in terms of the average of the scale, a one-way between-groups ANOVA was conducted. An F value of 0.91 with a corresponding significance of 0.46 revealed that participants from different socioeconomic groups did not differ in terms of their responses to the scale.

Instructional PC Use

Participants were asked about the frequency of instructional ICT use. Means of each ICT use group for the current scale are provided in Table 3.

Table 3. Descriptive statistics of each instructional ICT use group

	Everyday	2-3 times a week	Once a week	1-2 times a month	1-2 times a semester	Never	Total
N	380	820	532	449	291	26	2498
$\overline{X}$	2,25	2,19	2,15	2,08	2,08	2,27	2,16
S	0,61	0,57	0,56	0,56	0,52	0,67	0,57

As shown in the table, those who used ICTs more often seemed to have higher means than those who used them less frequently. The F value of 5.42 with a corresponding probability value below .001 indicated that instructional ICT use had an effect on averages. Multiple comparisons through Tamhane's T2 are provided in Table 4.

Table 4. Multiple comparisons and mean differences among levels of instructional ICT use

Group	Everyday (A)	2-3 times a week (B)	Once a week (C)	1-2 times a month (D)	1-2 times a semester (E)	Never (F)
A		0,06	0,1	0,16***	0,17***	-0,02
B			0,04	0,11*	0,11*	-0,08
C				0,06	0,07	-0,12
D					0,01	-0,18
E						-0,19
F						

p < * .05 **.01 ***.001

As shown in the table, the averages of those who used ICTs everyday or 2-3 times a week were significantly higher than those who used it 1-2 times a month or 1-2 times a semester. That is, those who used ICTs for instructional purposes had more positive opinions than those who used them less. Interestingly, those who never used ICTs for instructional purposes showed a different pattern than other ICT use groups and had the highest mean.

Computer Experience

Participants' PC experience ranged from 1 through 15 years. The average PC experience was 5.66 years with a standard deviation of 2.3. Neither parametric, nor non-parametric correlations between the scale average and the PC experience were significant (p > 0.194). In addition to PC experience, 1557 participants (63 %) who had a PC at home / dormitory and 929 participants (37 %) who did not have a PC were compared through an independent-sample t-test, which revealed that the averages were almost equal (p = 0.993).

CONCLUSION AND DISCUSSION

Findings of the current study showed similarities with some previous studies. For instance, the perceived negative picture regarding the ICT indicators supported the argument of Gülbahar (2008). That is, teacher training programs did not facilitate the effective integration and use of ICTs for instructional purposes sufficiently. ICT integration in instructional activities was considered ineffective (Demirarslan & Usluel, 2005), methods to help students to make use of technology were not followed (McRae, 2001), meaningful ICT experiences were considered limited (Pontier, 2005), instructors made limited use of ICTs for instructional purposes (Selwyn, 2007), a discrepancy between universal principles and actual classroom implementations were observed (Tondeur, Braak & Valcke, 2007), and programs and endeavors followed were found insufficient (Ajwa, 2007). Findings regarding weak infrastructure supported several previous studies as well (Akbaba-Altun, 2006; Clarke, 2007; El-Tigi, 2000; Göktaş et al, 2008; Gülbahar, 2008; Odabaşı, 2000; Ololube, 2006). Findings regarding technical assistance supported the argument of Tallent-Runnels et al. (2006) indicating that most universities did not have facilities to provide students and instructors with effective technical assistance.

Perceived problems related to Teaching-Learning Methods and Technical Assistance were parallel with the findings of Göktaş et al. (2008), which found similar results in primary and secondary education. As pre-service teachers did not experience appropriate ICT use for instructional purposes, they should not be expected to implement ICTs in their own classrooms (Barton & Haydn, 2006). Negative opinions regarding Policy indicated that administrators were unsuccessful in implementing constructive programs and policies to improve student attitudes (Gay et al., 2006). The negative picture observed in terms of Special Education supported the arguments of Edyburn (2000) and Morrison (2007), that is, current ICT implementations were far behind what was possible to do with them. In addition, even though creating learning communities within the society was regarded as an indicator of successful ICT integration (Hodgkinson et al., 2008); the average was quite low in Turkish education faculties.

Differences in terms of department and gender were supported by studies addressing digital divide (Alampay, 2006; Campbell, 2001). That is, different field experiences in departments and different life experiences regarding gender led to different opinions in terms of ICT integration. It was interesting that there was not any difference among participants with different family incomes. This finding somewhat conflicts with the arguments of Alampay (2006) and Hohlfeld et al. (2008) indicating an influence of socio-economic status on ICT related endeavors.

The fact that men had more positive opinions regarding technical issues was expected (Tanyeri, 2008; Vekiri & Chronaki, 2008). However, their positive opinions with regard to E-learning, Policy and Special Education should be further investigated. In addition, females found indicators of Learning Community more effective than males, which should be further examined. Finally, the fact that males and females did not differ in terms of Health indicators refuted a recent study (Odabaşı & Erişti, 2008).

Abovementioned differences in terms of gender and departments can be explained through gender socialization and occupation socialization theories. These theories were tested in the Mason and Mudrack (1996) study and supported in the Akbulut et al. (2008c) study. Gender socialization theory implies that women are more likely than men to be socialized to obey rules (Ward & Beck, 1990). On the other hand, occupational socialization theory implies that individuals are similar in outlook regardless of their genders (Adam, 2000). Women's positive opinions regarding Learning Communities and men's positive opinions regarding E-learning, Policy and Special Education might be explained through gender socialization theory. Differences in terms of departments, on the other hand, might be explained through the occupation socialization theory.

Similar to the Czerniewicz and Brown (2005) study, ICT use levels and frequencies did not have an effect on ICT indicators. On the other hand, the frequency of ICT use for instructional purposes had an effect on averages. That is, rather than the quantity of everyday PC experience, the quantity of instructional PC experience had an effect on perceptions regarding ICT indicators. That is, the type of experience was quite important (Dutt-Doner, Allen, & Corcoran, 2006).

The negative picture in terms of pedagogy and collaboration related indicators might stem from insufficient professional development (Odabaşı, 2003, 2005). This negative image might be eliminated through a reward mechanism focusing on quality instruction. In addition, continuous professional development activities addressing instructional ICT use can be helpful to improve with regard to Teaching-Learning Methods, Learning Communities, E-learning and E-interaction. Providing pre-service teachers with meaningful and instructional ICT use experiences carries importance since they cannot be expected to implement what they did not experience. In addition, rather than the quantity of PC experience, type of ICT experience matters. Finally, administrative precautions can eliminate the negative findings observed in technical and social issues.

Further research can administer similar data collection tools in different samples, investigate covariance errors among given ICT indicators in different contexts, and develop structural equation models to understand interrelationships among indicators. Such an approach can help scholars to determine priorities for action. Interesting findings can be found through administering similar data collection tools across more universities and investigating the relationship between ICT integration levels and university ranks by academic performance. For instance, a recent university ranking has been announced online by URAP Research Laboratory at http://www.urapcenter.org, whose findings might be used to explore the predictive power of academic ranking on ICT integration or vice versa.

The data collection tool used in the current study was quite comprehensive but somewhat insufficient since each indicator should be investigated with more scrutiny. In this regard, qualitative endeavors addressing the reasons of current findings can be helpful. In addition, pre-service teachers' opinions should be triangulated with the opinions of instructors, administrators and other shareholders of the process. Similar studies might be replicated with pre-service and in-service teachers to see the differences and similarities as well. Finally, an identical replication of the current study might be helpful, since several universities have been founded, quotas of existing departments have been increased, expelled students have been re-invited to universities, and the university entrance exam has been made easier to enroll more undergraduate students. Such changes might have transformed the nature of the research population, which necessitates replication even within the same sample.

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REFERENCES

Adam, A. (2000). Gender and computer ethics. *Computers and Society, December 2000*, 17-24.

Ajwa, I. (2007). Preparing future secondary computer science educators. *American Secondary Education, 35*, 54-62.

Akbaba-Altun, S. (2006). Complexity of Integrating Computer Technologies into Education in Turkey. *Educational Technology & Society, 9*, 176-187.

Akbulut, Y. (2009). Investigating underlying components of the ICT indicators measurement scale: the extended version. *Journal of Educational Computing Research, 40* (4), 405-427.

Akbulut, Y. (2010). A structural model proposal for Turkish faculties of education regarding ICT integration indicators. *Contemporary Educational Technology, 1*(4), 322-334.

Akbulut, Y., Kesim, M., & Odabaşı, H. F. (2007). Construct validation of ICT indicators measurement scale (ICTIMS). *The International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, *3*(3), 60-77.

Akbulut, Y., Odabaşı, H. F., & Kuzu, A. (2008a). Computer ethics: Scenes from a computer education department in Turkey. In U. Demiray & R. C. Sharma (Eds.), *Ethical practices and implications in distance learning* (pp.295-304). USA: IGI Global.

Akbulut, Y., Şendağ, S., Birinci, G., Kılıçer, K., Şahin, M.C., & Odabaşı, H. F. (2008b). Exploring the types and reasons of internet triggered academic dishonesty among Turkish undergraduate students. *Computers and Education, 51* (1), 463-473.

Akbulut, Y., Uysal, O, Odabaşı, H. F., & Kuzu, A. (2008c). Influence of gender, program of study and PC experience on unethical computer using behaviors of Turkish undergraduate students. *Computers and Education, 51* (2), 485-492.

Akbulut, Y., Şahin, Y. L., & Erişti, B. (2010). Cyberbullying victimization among Turkish online social utility members. *Journal of Educational Technology & Society, 13* (4), 192-201.

Akpınar, Y. (2003). Öğretmenlerin yeni bilgi teknolojileri kullanımında yükseköğretimin etkisi: İstanbul okulları örneği (Effects of the undergraduate education on teachers' use of new information technologies: Istanbul schools' case). *The Turkish Online Journal of Educational Technology, 2* (2), 79-96.

Alampay, E. A. (2006). Beyond access to ICTs: measuring capabilities in the information society. *International Journal of Education and Development using Information and Communication Technology (IJEDICT), 2* (3), 4-22.

Aşkar, P., Usluel, Y. K. & Mumcu, F. K. (2006). Logistic regression modeling for predicting task-related ICT use in teaching. *Educational Technology & Society*, *9* (2), 141-151.

Aypay, A. (2010). Information and communication technology (ICT) usage and achievement of Turkish students in Pisa 2006. *The Turkish Online Journal of Educational Technology, 9* (2), 116-124.

Barton, R., & Haydn, T. (2006). Trainee teachers' views on what helps them to use information and communication technology effectively in their subject teaching. *Journal of Computer Assisted Learning, 22*, 257–272.

Brill, J. M., & Galloway, C. (2007). Perils and promises: University instructors' integration of technology in classroom-based practices. *British Journal of Educational Technology, 38 (1), 95-105.*

Campbell, D. (2001). Can the digital divide be contained? The digital divide: employment and development implications. *International Labor Review*, *140*(2), 119-141.

Clarke, P. J. (2007). Exploring the use of computer technology in a Caribbean context: Views of pre-service teachers. *International Journal of Education and Development using Information and Communication Technology (IJEDICT), 3* (1), 23-38.

Czerniewicz, L., & Brown, C. (2005). Access to ICT for teaching and learning: From single artifact to interrelated resources. *International Journal of Education and Development using Information and Communication Technology (IJEDICT), 1*(2), 42-56.

Del Favero, M., & Hinson, J. M. (2007). Evaluating instructor Technology integration in community and technical colleges: A performance evaluation matrix. *Community College Journal of Research and Practice*, *31* (5), 389–408.

Demiraslan, Y. & Usluel, Y.K. (2005). Bilgi ve iletişim teknolojilerinin öğrenme öğretme sürecine entegrasyonunda öğretmenlerin durumu (Teachers' situation in the process of the integration of information and communication technologies to learning and teaching process). *The Turkish Online Journal of Educational Technology, 4* (3), 109-113.

Dutt-Doner, K., Allen, S. M., & Corcoran, D. (2006). Transforming student learning by preparing the next generation of teachers for type II technology integration. *Computers in the Schools*, *22* (3-4), 63-75.

Edyburn, D. L. (2000). Assistive technology and students with mild disabilities. *Focus on Exceptional Children*, *32* (9), 1-24.

El-tigi, M.A.D. (2000). Integrating WWW technology into classroom teaching: College students' perceptions of course web sites as an instructional resource. *Unpublished PhD Dissertation*. Syracuse University, NY, USA.

Eteokleous, N. P. (2004). Computer technology integration in Cyprus elementary schools. *Unpublished PhD Dissertation*. The Pennsylvania State University, PA, USA.

Educational Testing Service [ETS] (2007). *Digital transformation: A framework for ICT literacy.* (Report of the international ICT literacy panel).

Gay, G., Mahon, S., Devonish, D., Alleyne, P. & Alleyne, P. G. (2006). Perceptions of information and communication technology among undergraduate management students in Barbados. *International Journal of Education and Development using Information and Communication Technology (IJEDICT), 2* (4), 6-17.

Gibson, I. S., O'Reilly, C., & Hughes, M. (2002). Integration of ICT within a project-based learning environment. *European Journal of Engineering Education, 27* (1), 21-30.

Girgin, M. C., Kıyıcı, M, & Tanyeri, T. (2008). Mobile technologies for students with hearing disability (İBEM). Proceedings for Access to Learning for Development the 5th Pan-Commonwealth Forum on Open Learning (PCF5), 13 - 17 July, London.

Göktaş, Y., Yıldırım, Z., & Yıldırım, S. (2008). The keys for ICT integration in K-12 education: Teachers' perceptions and usage. *Hacettepe University, Journal of Education, 34,* 127-139.

Gülbahar, Y. (2008). ICT usage in higher education: A case study on pre-service teachers and instructors. *The Turkish Online Journal of Educational Technology, 7* (1), 32-37.

Hartley, J. (2007). Teaching, learning and new technology: A review for teachers. *British Journal of Educational Technology*, *38* (1), 42-62.

Hennessy, S, Ruthven, K, & Brindley, S. (2005). Teacher perspectives on integrating ICT into subject teaching: commitment, constraints, caution and change. *Journal of Curriculum Studies, 37* (2), 155-192.

Hodgkinson-Williams, C., Slay, H., & Siebörger, I. (2008). Developing communities of practice within and outside higher education institutions. *British Journal of Educational Technology*, *39* (3), 433-442.

Hohlfeld, T. N., Ritzhaupt, A. D., Baron, A. E., & Kemker, K. (2008). Examining the digital divide in K-12 public schools: Four-year trends for supporting ICT literacy in Florida. *Computers & Education*, *51* (4), 1648–1663.

Ilomaki, L., & Rantanen, P. (2007). Intensive use of ICT in school: Developing differences in students' ICT expertise. *Computers & Education*, *48* (1) 119–136.

Isikoglu, N. (2002). Integration of computer technology into early childhood curriculum. *Unpublished PhD Dissertation*. The Pennsylvania State University, PA, USA.

Jung, I. (2005). ICT-pedagogy integration in teacher training: application cases worldwide. *Educational Technology & Society, 8* (2), 94-101.

Kahveci, A., Şahin, N., & Genç, Ş. (2011). Computer perceptions of secondary school teachers and impacting demographics: A Turkish perspective. *The Turkish Online Journal of Educational Technology, 10* (1), 71-80.

Knight, C., Knight, B. A., & Teghe, D. (2006). Releasing the pedagogical power of information and communication technology for learners: A case study. *International Journal of Education and Development using Information and Communication Technology (IJEDICT), 2* (2), 27-34.

Liu, Y., & Huang, C. (2005). Concerns of teachers about technology integration in the USA. *European Journal of Teacher Education, 28* (1), 35-47.
Mason, E. S., & Mudrack, P. E. (1996). Gender and ethical orientation: A test of gender and occupational socialization theories. *Journal of Business Ethics, 15*, 599-604.
McRae, P. (2001). Increasing the integration of technology into the fourth-grade curriculum using teacher/media specialist collaboration in planning student research activities. *Unpublished PhD Dissertation*. Nova Southeastern University, FL, USA.
Mobbs, P. (2002). *GreenNet CSIR Toolkit Briefing Glossary and Cross-Reference Index. GreenNet Civil Society Internet Rights Project*. Retrieved December 2, 2006, from http://www.fraw.org.uk/library/005/gn-irt/gossary.html
Morrison, K. (2007). Implementation of assistive computer technology: A model for school systems. *International Journal of Special Education*, *22* (1), 83-95.
Mueller, J., Wood, E., Willoughby, T., Ross, C., & Specht, J. (2008). Identifying discriminating variables between teachers who fully integrate computers and teachers with limited integration. *Computers & Education*, *51* (4), 1523–1537.
Odabaşı, F. (2000). Faculty use of technological resources in Turkey. *Innovations in Education and Training International, 37* (2), 103-107.
Odabaşı, H. F. (2003). Faculty point of view on faculty development. *Hacettepe University Journal of Education, 24*, 86-89.
Odabaşı, F. (2005). The status and need for faculty development in Turkey. *International Journal for Academic Development*, *10* (2), 139-142.
Odabaşı, F., Akbulut, Y., Çuhadar, C., Dursun, Ö. Ö., Kabakçı, I., Kılıçer, K., Kurt, A. A., Şendağ, S., & Tanyeri, T. (2006). *Turkey basic education project: Baseline study on ICT integration*. Ankara: Ministry of National Education Projects Coordination Center. Retrieved October 24, 2007, from http://fodabasi.home.anadolu.edu.tr/doc/ey6.swf
Odabaşı, F., Çuhadar, C., Kuzu, A. (2008). Scenario development for a mobile learning course. *Proceedings for Access to Learning for Development the 5th Pan-Commonwealth Forum on Open Learning (PCF5)*, 13 - 17 July, London.
Odabaşı, F., & Erişti, S., D. (2008). Awareness of healthy computer use and computer ergonomics among pre-service teachers. *The International Journal of Technology Knowledge and Society, 4* (1), 19-30.
Ololube, N. P. (2006). Appraising the relationship between ICT usage and integration and the standard of teacher education programs in a developing economy. *International Journal of Education and Development using Information and Communication Technology (IJEDICT), 2* (3), 70-85.
Özdemir, S. & Kılıç, E. (2007). Integrating information and communication technologies in the Turkish primary school system. *British Journal of Educational Technology, 38*, 907-916.
Pompeo, J. M. (2004). A study of computer integration on public secondary schools. *Unpublished PhD Dissertation*. The State University of New Jersey, NJ, USA.
Pontier, D. A. (2005). *Kansas High School Computer Science Teachers' Professional Development*. Unpublished M.A. Thesis, University of Kansas.
Rodríguez, C. E. G. (2006). Educative uses of ICT, technological skills and academic performance of the Venezuelan university students: A causal perspective. *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, *2* (4), 28-43.
Selwyn, N. (2007). The use of computer technology in university teaching and learning: A critical perspective. *Journal of Computer Assisted Learning*, *23*, 83–94.
Shafiei, M. (2005). Factors contributing to participation in faculty development and integration of computer technology in the community college. *Unpublished PhD Dissertation*, University of Houston, TX, USA.
Smith, S. J., & Robinson, S. (2003). Technology integration through collaborative cohorts: Preparing future teachers to use technology. *Remedial and Special Education, 24* (3), 154-160.
Şahin, I. (2011). Development of survey of technological pedagogical and content knowledge (TPACK). *The Turkish Online Journal of Educational Technology, 10* (1), 97-105.
Tallent-Runnels, M. K., Thomas, J. A., Lan, W. Y., Cooper, S., Ahern, T. C., Shaw, S. M., & Liu, X. (2006). Teaching courses online: A review of the research. *Review of Educational Research, 76* (1), 93–135.
Tanyeri, T. (2008). Matematik öğretimine bilgi ve iletişim teknolojilerinin entegrasyonu konusunda paydaş görüşleri (Perspectives regarding ICT integration in mathematics education). *Unpublished PhD Dissertation*. Anadolu University, Turkey.
Toledo, C. (2005). A five-stage model of computer technology integration into teacher education curriculum. *Contemporary Issues in Technology and Teacher Education, 5* (2), 177-191.
Tondeur, J., Braak, J. V., & Valcke, M. (2007). Curricula and the use of ICT in education: Two worlds apart? *British Journal of Educational Technology, 38* (6), 962-976.

Underwood, J., & Szabo, A. (2003). Academic o□ences and e-learning: Individual propensities in cheating. *British Journal of Educational Technology*, *34*(4), 467–477.
UNESCO (2002). *Information and communication technologies in teacher education: A planning guide.* Retrieved February 6, 2006, from http://unesdoc.unesco.org/images/0012/001295/129533e.pdf
Usluel, Y. K., Aşkar, P., & Baş, T. (2008). A structural equation model for ICT usage in higher education. *Educational Technology & Society*, *11* (2), 262-273.
Vekiri, I, & Chronaki, A. (2008). Gender issues in technology use: Perceived social support, computer self-e□cacy and value beliefs, and computer use beyond school. *Computers & Education, 51* (4), 1392–1404.
Wainer, J., Dwyer, T., Dutra, R. S., Covic, A., Magalhaes, V. B., Ferreira, L. R. R., Pimenta, V. A., & Claudio, K. (2008). Too much computer and Internet use is bad for your grades, especially if you are young and poor: Results from the 2001 Brazilian SAEB. *Computers & Education, 51* (4), 1417–1429.
Ward, D. A., & Beck, W. L. (1990). Gender and dishonesty. *The Journal of Social Psychology, 130,* 333-339.
World Summit on the Information Society (WSIS, 2003). *Geneva Declaration of Principles*. Document ID: WSIS-03/GENEVA/DOC/4-E
Yücel, C., Acun, İ., Tarman, B., & Mete, T. (2010). A model to explore Turkish teachers' ICT integration stages. *The Turkish Online Journal of Educational Technology, 9* (4), 1-9.

PERSONALIZATION PRINCIPLE IN MULTIMEDIA LEARNING: CONVERSATIONAL VERSUS FORMAL STYLE IN WRITTEN WORD

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ABSTRACT
The purpose of the study is to examine the effect of appropriately designed multimedia software for both conversational and formal styles with respect to various variables. The model of nonequivalent control group was used in the study. While the group studying with the multimedia material in formal style included 22 students, the other group studying in the conversational style included 23 students. The data collection tools used in the study involved an achievement test, the cognitive load scale for both groups and a questionnaire about the students' views of the style used in the personalized group. As a result, a significant difference was found between the cognitive load scores of the students in the personalized group and those of the students in the non-personalized group. However, no significant difference was found between the background knowledge levels of the personalized and non-personalized groups and their posttest achievement scores. In the study, the learners who were in the personalized group stated that the style used in the software motivated them to study and they felt as if they were talking to a human. Additionally, they stated that they preferred similar multimedia software to be used in their other courses and they demanded the use of such multimedia software in face-to-face education.
Keywords: Multimedia learning, personalization, conversational style, formal style

INTRODUCTION
The infusion of multimedia into teaching and learning has considerably altered the instructional strategy in our educational institutions and changed the way teachers teach and students learn (Neo and Neo, 2003). However, a student working with multimedia software is alone but with the texts, narrations, feedback and cues in multimedia software and is provided with a conversation. Therefore, Mayer suggested the personalization principle. According to the personalization principle, people learn better through multimedia presentations in which the words are in the conversational style rather than in the formal style (Mayer, 2005, 2009). The findings of total 11 experiments carried out by Mayer and his colleagues revealed that the students taking the instructional content via the conversational style demonstrated better performance in transfer tests than the students taking the instructional content via the formal style (Mayer, 2009).

In general, the instructional content in multimedia software is given via the formal style. When the instructional content in multimedia software is transformed from the formal style to the conversational style, the personalization principle occurs. The conversational style can be formed in two ways: The first way is to use "I" and "you" instead of a third person in the instructional content. The second way is to include direct comments into the instructional content for the learner. Here, while the instructional content remains the same, only the presentation style of the content changes (Mayer, 2005). When the sample presented in Table 1 is examined, it is seen that the statement by a third person in the formal style was transformed into the conversational style by using "you" and adding the statement of "I wish I attended this class".

Table 1. A sample for the formal style and the conversational style

Formal style (non-personalized): "Since p value was .01, it could be stated that the mean score of the students in Teacher Yasemin's class (70.82) was significantly higher than the overall mean of students in Turkey (65.43) …"
Conversational style (personalized): "Since p value was .01, you could say the mean score of the students in Teacher Yasemin's class (70.82) was significantly higher than the overall mean of students in Turkey (65.43). I wish I attended this class…"

PURPOSE OF THE STUDY
The purpose of the study was to examine the multimedia software appropriately designed for the conversational and formal styles with respect to various variables. In line with this overall purpose, the research questions were as follows:

1. Is there a significant difference between the post-test achievement scores of the students studying with the multimedia software designed in conversational style and the post-test achievement scores of those studying with the multimedia software designed in formal style?
2. Is there a significant difference between the cognitive load scores of the students studying with two different multimedia softwares designed in accordance with either the conversational style or the formal

style?
3. What are the views of the students studying with the multimedia software designed in conversational style about this software?

THEORETICAL FRAMEWORK

In this part, politeness theory, cognitive load theory and social agency theory constituting the theoretical basis of the study are explained.

Social agency theory: Mayer and his colleagues put forward the social agency theory. According to this theory, like the conversational style, social cues can help learners study harder in a multimedia learning environment. Figure 1 presents the social agency theory (Mayer, 2009).

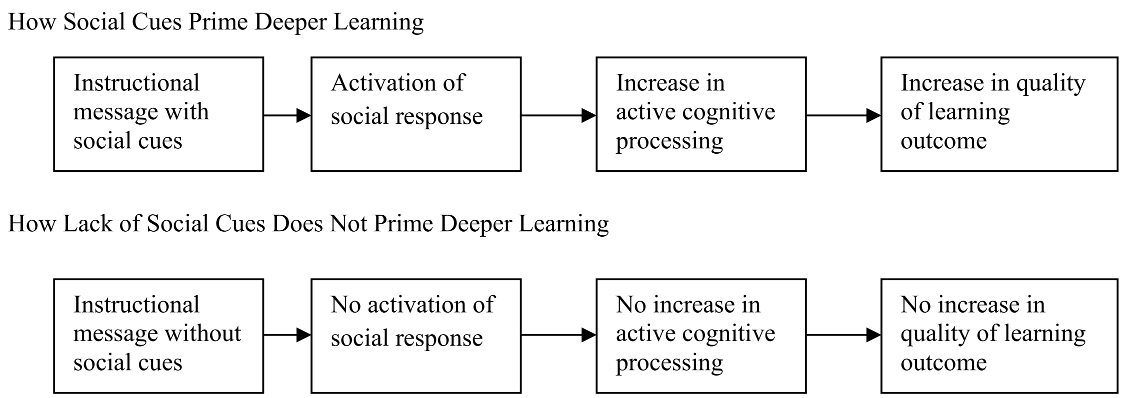

Figure 1. Social agency theory (Mayer, 2005, 2009)

As can be seen in the upper row in Figure 1, when the instructional messages include social cues (e.g. conversational style), the learner considers the tutor as a conversational partner. Thus, the learners' cognitive processes are active in order to make sense of the tutor's message. This situation increases the quality of learning outcomes. As can be seen in the lower row in Figure 1, when the instructional messages do not include any social cues (e.g. formal style), the learner does not consider the tutor as a conversational partner. Thus, learners are likely to make less effort to make sense of the tutor's message. In this case, the quality of the learning outcomes will not be improved (Mayer, 2009). In the present study, the multimedia software including social cues (conversational style) was compared with the multimedia software without any social cues (formal style).

Politeness theory: The politeness theory was introduced by Brown and Levinson (1987). The theory suggests that everybody has a positive face and a negative face. The negative face does not like being prevented. The positive face wants its demands to be approved. The suggestions and feedback as well as communicative acts in the instructional software are likely to threaten the positive and/or negative face(s) of the learners. For example, if the feedback in the software criticizes the learner, the learner may think his or her positive face is not approved. Similarly, if the feedback in the software gives advice to the learner, the learner may think his or her negative face is prevented and believe he or she is hindered. If polite tutors adopt a cooperative approach to the learner (e.g. "Let's read the following example"), this may decrease the threats to the positive face of the learner. In addition, if polite tutors do not restrict the freedom of the learner (e.g. "You could press the SPACE key"), this may decrease the threats to the negative face of the learner. In this study, the feedback in the multimedia software designed in conversational style was written in polite style.

Cognitive load theory: The cognitive load theory was put forward by Chandler and Sweller (1991). The cognitive load theory focuses on cognitive processes. Cognitive load increases with the existence of out-of-topic activities in the multimedia learning environment; thus, learning is damaged. The running memory has a limited capacity. An individual's exposure to a great amount of information causes to exceed the capacity of the running memory; resultantly cognitive overload occurs. The present study investigates whether the use of the conversational style as a text type is a factor increasing cognitive load.

LITERATURE REVIEW

In the literature, there are several studies investigating the influence of the multimedia instructional messages - given in the conversational style (personalized) and the formal style (non-personalized) - on students' achievement. Moreno and Mayer (2000), examined whether the multimedia messages given in conversational and formal style in a multimedia science lesson increases learning through a study involving five experiments. The instructional content was presented via narration in the first, third and fifth experiments and via the text on the computer screen in the second and fourth experiments. In the study, it was concluded that the students receiving the instructional content via the conversational style demonstrated better performance in problem solving tests than those receiving the instructional content via the formal style. Mayer, Fennell, Farmer, and Campbell (2004) examined the performances of the students taking the personalized or non-personalized versions of a narrated animation explaining how the respiratory system of the humans functions. At the end of all the three experiments the researchers conducted, they found out that the students in the personalized group were significantly more successful in transfer tests than those in the non-personalized group. Similarly in another study carried out by Moreno and Mayer (2004), the students studied via an agent-based multimedia educational game. The agents used personalized or non-personalized speech. The students learning via the personalized version were more successful in the reminder and problem solving tests. Most of the studies in related literature focused on the achievement levels of the participants in conversational and formal styles. This study not only aims at finding possible achievement differences but also the amount of cognitive load expent and the participants' views about use of conversational style. The related literature demonstrates that in the studies conducted with the conversational style and formal style, the learners studied via software for a quite short period of time (60 seconds, 140 seconds and so on). In the present study, the learners studied the instructional content for 30 minutes. Therefore, this study could be said to be carried out in a more realistic learning environment.

Personalization can be promoted through politeness (Clark and Mayer, 2008). When the instructional content is presented to the students in the polite style, they demonstrate better performance than they do when it is presented in direct style; which indicates the politiness effect. When the studies on the politeness effect are examined, it is seen that the instructional contents presented via the polite style were compared with direct conversational style. In a study carried out by Mayer, Johnson, Shaw, and Sandhu (2006), the students scored the explanations based on positive and negative politeness. The students assigned lower scores to imperatives but higher scores to the statements based on politeness. The learners with little experience in computer use assigned higher scores to politeness-based statements than those with more experience in computer use. Wang, Johnson, Mayer, Rizzo, Shaw and Collins (2008) examined the influence of students' receiving polite feedback or direct feedback while learning via multimedia educational game on their test performances. The results of the study revealed that the students studying with the polite tutor were more successful in the transfer test. McLaren, DeLeeuwb, and Mayer (2011a) compared the polite conversational feedback and hints (e.g. "Shall we calculate the result now?") found in web-based intelligent tutors with the direct conversational feedback and hints (e.g. "The tutor wants you to calculate the result now"). In the study carried out in a laboratory setting, the researchers assumed that students learning via polite tutors would demonstrate better performance in transfer tests than those learning via direct tutors and that the politeness effect would be stronger with the students with low level of background knowledge than with those with high level of background knowledge. However, when the results considered, it was seen that politeness effect occurred only with the students with low level of background knowledge. This finding reveals an important boundary condition of politeness effect. Politeness effect is unlikely to occur with the students with high level of background knowledge but with the students with low level of background knowledge. McLaren, DeLeeuwb, and Mayer (2011b) conducted another study in a classroom setting - similar to their previous study carried out in the laboratory setting. The researchers compared the polite feedback and hints found in web-based intelligent tutors (e.g. "Let's calculate the result now") with the direct feedback and hints (e.g. "The goal here is to calculate the result"). In the study, two hypotheses were put forward: (1) students studying with polite tutors learn better than those studying with direct tutors and (2) politeness effect will be stronger for the students with low level of background knowledge than for those with high level of background knowledge. As a result of the study, no significant difference was found between the achievement levels of the polite and direct groups. Unlike the studies carried out in a laboratory setting by McLaren, DeLeeuwb and Mayer, politeness effect did not occur with the students with low level of background knowledge. Different from most of the studies carried out in laboratory setting, this study was conducted in real classroom environment equipped with computers, which might help to promote more realistic results. In the present study, polite conversational style was used for feedback but no comparison between polite feedback and direct feedback was aimed.

METHOD

This part of the paper presents the research model, participants, data collection tools, multimedia materials, application process and data analysis.

Research Model

In the study, the model of nonequivalent control group was used. In this model which is similar to the model of pretest-posttest control group, the groups are not formed randomly. In other words, in this model, there is no special effort to equate the groups via objective assignment, but it is especially important to have subjects as similar as possible. The design allows to increase the number of the groups to have multiple groups, but it does not allow to have a control group (Balcı, 2001). Table 1 presents the symbolic appearance of the model used in the study.

Table 1. Research model

Group	Pretest	Experimental procedure	Posttest
G1 – experimental group (23 students)	ACT1	Studying with the multimedia in conversational style CLS	ACT2
G2 – control group (22 students)	ACT1	Studying with the multimedia in formal style CLS	ACT2

Meanings of the symbols used in the design:
G1: The group taking the multimedia in conversational style
G2: The group taking the multimedia in formal style
ACT1: Academic Achievement Test (Pretest)
ACT2: Academic Achievement Test (Posttest)
CLS: Cognitive Load Scale

Participants
The participants of the study were 3rd grade students taking the course of Scientific Research Methods-ARY204 in the Department of Computer Education and Instructional Technologies (CEIT) at the Education Faculty of Anadolu University. All the participants took this course for the first time. Since the participants were students from CEIT, they had high level of experience in computer use ($\overline{X}$=7 years). In the study, the group studying with the multimedia material in formal style included 22 (4 female and 18 male) students, and the group studying with the multimedia material in conversational style included 23 (6 female and 17 male) students.

Data Collection Tools
In the study, the tools used to gather data included an achievement test, the cognitive load scale and a questionnaire inquiring the students' views of the style used in the personalized group.

Achievement test: The achievement test including multiple choice test items was developed by the researcher. For the content validity and face validity of the test, three field experts were asked for their views (two of whom were experts in CEIT and the other in measurement & assessment). In line with the views and suggestions of the experts, the necessary changes were made, and the test including ten questions was finalized and made ready for the application.
Cognitive load scale: The cognitive load scale was used to measure the mental effort imposed on the participants while they learn the concepts with the multimedia instructional material. The 9-point likert-type scale was developed by Paas and Van Merriënboer (1993) and converted into Turkish by Kılıç and Karadeniz (2004). The internal consistency coefficient of the scale translated into Turkish was 0.78, and the Spearman Brown split half test correlation was 0.70. The scores to be obtained from the scale changed between the points of 1 and 9. The scores between 1 and 4 indicate low cognitive load; 5 corresponds to medium load and the scores between 6 and 9 demonstrate high cognitive load.

Questionnaire: The questionnaire including 10 five-point likert-type items and an open-ended question about the style used in the personalized group was developed by the researcher. For the content validity and face validity of the questionnaire, three field experts (two of whom were experts in CEIT and the other in measurement & assessment) were asked for their views. In line with the views and suggestions of the experts, the necessary changes were made to finalize the questionnaire.

Multimedia instructional materials
For the application of the study, the lesson unit of "t test and t test types" of the course of Scientific Research Methods - ARY204 – was developed as a multimedia material by the researcher and one academician. First, in line with the objectives of the lesson unit, the content was prepared, and two multimedia materials with the same content but in different styles (conversational and formal styles) were designed. The multimedia instructional materials were prepared with the Adobe Flash software, and for the preparation of the visuals, the Adobe Photoshop software was used. Following the development of the instructional software, the materials were

presented to three academicians expertized in subject matter, graphics and instructional design respectively. In line with the views and suggestions of the experts, the instructional materials were finalized. Figure 2 and 3 display the sample screens for the software.

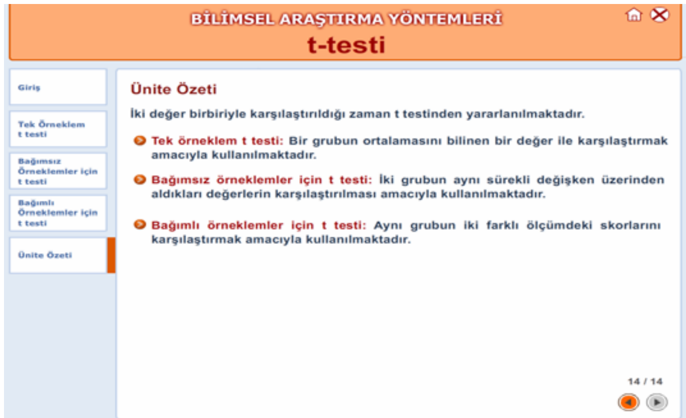

Figure 2. Sample screen for the non-personalized group

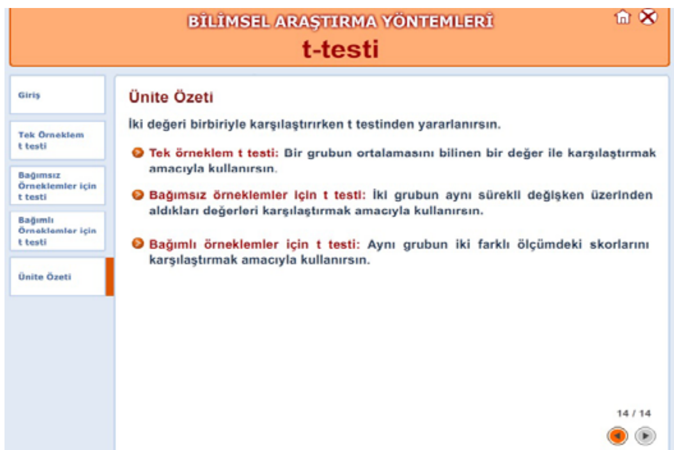

Figure 3. Sample screen for the personalized group

Application process
During the application of the study carried out in the Fall Term 2010-2011 academic years the process followed was described as follows:

- In the first hour of the course, the academic achievement test (pretest) was given to the students in both groups.
- The students in the first group studied individually with the multimedia instructional material prepared in conversational style, and the students in the second group studied individually with the multimedia instructional material prepared in formal style. During the application, the cognitive load scale was given to the students in paper-and-pencil form. The cognitive load scale included a question inquiring the extent of the cognitive load each student expended on each concept in the lesson unit. The students marked the appropriate option in the scale after they studied each concept.
- At the end of the application, the students in both groups were given the academic achievement test (posttest).
- The students in the personalized group were given the questionnaire adressing to the conversational style version of the software they studied with.

Data Analysis
In the study, the statistical significance level was taken as .05. In order to see whether the data obtained in the study had a normal distribution or not, Shapiro-Wilk normality test was applied. As a result of the analysis conducted, it was found out that the academic achievement pretest and posttest scores of the students in the personalized group and those of the students in the non-personalized group did not have a normal distribution ($p<.05$). Therefore, non-parametric tests were used for the analyses of these data sets. When it comes to

cognitive load scores, it was found that the mean cognitive load scores of the personalized and non-personalized groups had a normal distribution (p>.05). Therefore, parametric tests were used for the analyses of these data sets. As a result of the Mann-Whitney U test applied to determine whether the background knowledge levels of the personalized and non-personalized groups (pretest achievement scores) were equal, no significant difference was found between the background knowledge levels of the two groups (p>.05).

Mann-Whitney U test was applied to answer the first research question. For the second research question, independent samples t test was run and to find an answer for the third research question; mean scores were used for the analysis of the quantitative data. Besides, descriptive analysis was used to analyze the quantitative data and the formula [(n-1)/n] was used to interpret the data obtained from five-point likert-type questionaire items. The score ranges of 1,00-1,80 represented “strongly disagree”, 1,81-2,60 “disagree”, 2,61-3,40 “partly disagree”, 3,41-4,20 “agree” and 4,21-5,00 “strongly agree”.

FINDINGS

Background Knowledge Levels

There was no significant difference between the background knowledge levels of the personalized and non-personalized groups according to their pretest achievement scores (p>.05). The maximum score to be obtained from the achievement test was 10. As a result of the analysis, it was seen that the pretest achievement scores of both groups (personalized $\bar{X}$= 1.22, non-personalized $\bar{X}$=2.09) were quite low. The students’ low level of background knowledge about the subject means that the personalization principle could be tested more reliably (Mayer, 2009).

Posttest Achievement Scores

As can be seen in the Table 1, the results of the Mann-Whitney U test revealed no significant difference between the posttest achievement scores of the students in the personalized and non-personalized groups (p>.05).

Table 1. Mann-Whitney U test regarding the posttest achievement scores

Group	n	Mean Rank	Sum of Ranks	U	p
Personalized	23	21.55	474	221	.447
Non-personalized	22	24.39	561		

Although there was no significant difference between the posttest achievement scores of both groups, it was revealed that the mean of the personalized group ($\bar{X}$=8.52) was higher than that of the non-personalized group ($\bar{X}$=8.40).

Cognitive Load Scores

Table 2 demonstrates that there was a significant difference between the cognitive load scores of the students in the two different groups (p<.05).

Table 2. Independent samples t test regarding the cognitive load scores

Group	N	$\bar{X}$	sd	t	p
Personalized	23	6.03	1.48	-2.86	.007
Non-personalized	22	4.67	1.71		

The cognitive load score of the personalized group ($\bar{X}$=6.03) was found significantly higher than the cognitive load of the non-personalized group ($\bar{X}$=4.67). While the software in the personalized group caused excessive cognitive load on the learners, the software in the non-personalized group resulted in low level of cognitive load.

Students’ Views about the Software in the Personalized Group

Table 3. Descriptive Data Regarding Students’ Views about the Software in the Personalized Group

	N	$\bar{X}$
1. I enjoyed the style used in the multimedia software.	23	3,96
2. The style used in the multimedia software motivated me to study.	23	3,52
3. The style used in the multimedia software helped me adapt in the learning environment.	23	3,48
4. I believe the style used in the multimedia software increased my learning.	23	3,48

5. I think the style used in the multimedia software was related with real life.	23	3,52
6. The style used in the multimedia software increased my confidence in the instructional source.	23	3,35
7. I think the style used in the multimedia software is not important.	22	1,82
8. I felt comfortable with the style used in the multimedia software.	23	3,61
9. I prefer the use of multimedia software designed with this style in my other courses.	22	3,73
10. I want this style to be used in face-to-face education as well.	23	3,78

As can be seen in Table 3, the students in the personalized group stated that they "agreed" with the 1st, 2nd, 3rd, 4th, 5th, 8th, 9th and 10th items while they "partly agreed" with the 6th item and "disagreed" with the 7th item. The students in the personalized group believed that the software motivated them, helped them adapt in the learning environment and increased their learning. In addition, the students thought that the conversational style was important and wanted it to be used in face-to-face education.

The responses given to the open-ended question of the questionnaire revealed that the students considered the style learner-friendly and different from the usual style (formal style) and that the style fostered their motivation. Some of the views of the students about the software are as follows:

"The samples used made it more memorable, and as the style was not formal, I felt more comfortable with it."
"I felt as if I was talking to a human. It was a simple, pure and comprehensible language. I think it is a style that makes studying more enjoyable."
"First, a style like this surprised me, but it is a good method for self-learning."
"The style is quite good and motivating…"

DISCUSSION AND CONCLUSION

The study aimed at examining multimedia software appropriately designed for the conversational style and formal style with respect to various variables. Unlike most of the studies reported in the related literature (e.g. Mayer, Fennell, Farmer, and Campbell, 2004; Moreno and Mayer, 2004; Moreno and Mayer, 2000), in the present study carried out, no significant difference was found between the posttest achievement scores of the students in the personalized group and non-personalized group. This finding of the present study does not support the personalization principle in multimedia which was put forward by Mayer (2005, 2009).

Mayer, Johnson, Shaw, and Sandhu (2006) stated that the instructional content developed based on politeness could be more influential on the students with low level of experience in computer use. Similarly, in the present study, it could be stated that as the learners had a high level of experience in computer use, the personalized group who received polite style feedback were not significantly more successful than the non-personalized group.

The present study carried out in the classroom setting revealed parallel results to the findings of a previous study carried out in an equal setting by McLaren, DeLeeuwb and Mayer (2011b), which reported that "politeness effect did not occur with students who had low level of background knowledge". This result is just the opposite of the result of another study conducted in the laboratory setting by McLaren, DeLeeuwb and Mayer (2011a) (for example, an artificial environment in which the study is carried out with paid participants). Therefore, more studies should be conducted on politeness effect in the real classroom setting. The results of this study, in which no politeness effect occurred, differed from the findings of another study carried out by Wang, Johnson, Mayer, Rizzo, Shaw and Collins (2008), which reported that "the students studying with polite tutor are more successful in transfer test".

While the software in the personalized group required excessive cognitive load from the learners, the software in the non-personalized group entailed low level of cognitive load from them. One of the reasons of this finding may be the fact that the personalized group was not accustomed to the content presented with the conversational style. In Turkish education system, instructional contents are presented with the formal style mostly. Therefore, students might be unfamiliar with the conversational style.

Results revealed that the learners tended to expend higher cognitive load in conversational style, yet they seemed to state positive views about the style used in the multimedia software. Most of the mean scores of their views were just above 3.50 but they were not high enough. One reason for this might be that the participants were not familiar with a learning environment in which conversational style was used. Formal style is mostly used in their classrooms rather than conversational style. Another reason might be that the participants studied with this style only one class hour. Their views might turn out to be more positive as they spend more time with this style. The learners stated that the style used in the software motivated them to study and they felt as if they were talking to a human. Furthermore, the learners expressed that similar multimedia software should be used in their other courses and that they wished the use of such multimedia software in face-to-face education. This result may have stemmed from the fact that the students seemed to feel as if they were studying in an entertaining atmosphere rather than just studying a lesson while using the multimedia.

In contrast to the previous studies conducted with short time (60 seconds, 140 seconds and so on) treatments (e.g. Mayer, Fennell, Farmer, and Campbell, 2004; Moreno and Mayer, 2004; Moreno and Mayer, 2000), in the present study carried out on the personalization principle, learners studied for one course-hour (30 minutes) with the software. However, no significant difference was found for the learners' achievement level. Therefore, it is believed that the present study revealed more realistic results. In this respect, the personalization principle should be tested in various courses with dissimiliar target populations and for a different period of time.

Among a few limitations of this study, it can be counted that the findings are limited to low number of participants. There might be more realistic findings if the same study is conducted with larger sample. Another limitation can be that only written data was gathered from the participants through pre and post-tests, cognitive load scale and the questionnaire. Data collection might become stronger if oral interviews with participants are conducted. This would provide more detailed information about the participants' views and also weak and strong points related to different styles. In this study cognitive load levels of the students studying in personalized style were found to be higher. This result might be questioned through oral interviews more healthily.

REFERENCES

Brown, P., & Levinson, S.C. (1987). *Politeness: Some universals in language use.* New York: Cambridge University Press.

Chandler, P. ve Sweller, J. (1991). Cognitive load theory and the format of instruction. *Cognition and Instruction, 8,* 293–332.

Clark, R.C., & Mayer, R.E. (2008). *E-Learning and the science of instruction* (2nd ed.). San Francisco: Pfeiffer.

Mayer, R. E., Fennell, S., Farmer, L., & Campbell, J. (2004). A personalization effect in multimedia learning: Students learn better when words are in conversational style rather than formal style. *Journal of Educational Psychology, 96* (2), 389-395.

Mayer, R.E. (2005). Principles of multimedia learning based on social cues: Personalization, voice, and image principles. In Mayer, R.E. (Ed.), *The Cambridge handbook of multimedia learning* (pp. 201–212). New York: Cambridge University Press.

Mayer, R.E. (2009). *Multimedia learning* (2nd ed.). New York, USA: Cambridge University Press.

McLaren, B.M., DeLeeuwb, K.E., & Mayer, R.E. (2011a). A politeness effect in learning with web-based intelligent tutors. *International Journal Human-Computer Studies, 69,* 70-79.

McLaren, B.M., DeLeeuwb, K.E., & Mayer, R.E. (2011b). Polite web-based intelligent tutors: Can they improve learning in classrooms? *Computers & Education, 56* (3), 574–584.

Moreno, R., & Mayer, R. E. (2000). Engaging students in active learning: The case for personalized multimedia messages. *Journal of Educational Psychology, 92* (4), 724-733.

Moreno, R., & Mayer, R.E. (2004). Personalized messages that promote science learning in virtual environments. *Journal of Educational Psychology, 96* (1), 165-173.

Neo, M., & Neo, T. K. (2003). Developing a student-centered learning environment in the Malaysian classroom - a multimedia learning experience. *The Turkish Online Journal of Educational Technology – TOJET, 2* (1).

Wang, N., Johnson, W.L., Mayer, R.E., Rizzo, P., Shaw, E., & Collins, H. (2008). The politeness effect: Pedagogical agents and learning outcomes. *International Journal of Human-Computer Studies, 66,* 98-112.

PROVIDING ADEQUATE INTERACTIONS IN ONLINE DISCUSSION FORUMS USING FEW TEACHING ASSISTANTS

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ABSTRACT
In order to encourage students to participate in online learning forums, prompt responses to their questions are essential. To answer students' online questions, teaching assistants are assigned to manage discussions and answer questions in online learning forums. To minimize the response time, many teaching assistants may be needed to interact with learners. We investigated the trade-off between the request-response time and the cost of labor for handling the requests since this has become a challenging and important issue for education managers. In this study, a queuing-based model is proposed to construct the relationship between response time and the human resource requirement in a learning forum. In addition, an experiment using students in a Computer Science Introduction course at a vocational high school was conducted to verify the model and determine the average number of assistants required so that the students' questions can be answered within an acceptable time interval, providing valuable information for managing online discussion forums for educational purposes. Finally, the participants' perceptions were investigated using a questionnaire revised from the Technology Acceptance Model (TAM) in order to identify whether feelings of the perception-of-usefulness and the perception-of-satisfaction during the response wait time showed significant differences when the number of teaching assistants was reduced. The results revealed no significant difference in learners' perceptions after reducing the number of teaching assistants. It confirms that using the model to predict the number of required teaching assistants is highly reliable, and effective in reducing labor costs without jeopardizing student satisfaction.
Keywords: queuing-based model, response time, human resource requirement, learning forum, technology acceptance model.

INTRODUCTION
The interaction between instructors and students is indispensable for online learning. Gates, Myhrvold, and Rinearson stated that the information superhighway (i.e. Internet) makes it easier to keep up with distant acquaintances by reducing the amount of time for socializing and interacting with distant people (Gates, Myhrvold, & Rinearson, 1995). With the advance of information and communication technologies (ICT), researchers have attempted to provide guidelines for technology-supported learning communities. Several studies have indicated that the facilities of learning communities are helpful to learners in sharing and constructing knowledge via online interactions (Lave & Wenger, 1991; Jonassen, Peck, & Wilson, 1999). The common component of those studies is participation that promotes students' active involvement in learning processes. In other words, the most important role of an online instructor is to ensure the participation of students online.

A network-based virtual community usually consists of participants who congregate due to common interests and exploration of certain issues (Palloff & Pratt, 1999). Researchers have indicated that regular discussions and sharing viewpoints are the certain characteristics of a sound learning community (Collison, Elbaum, Haavind, & Tinker, 2000). Among the various functions of online learning communities, online discussion forums (ODF), in which the learners only need to select a subject and interact with others by browsing and posting articles, may be the most popular (Hann, Glowacki-Dudka, & Conceicao-Runlee, 2000). An ODF for learning communities, sometimes called a *learning forum*, can provide students with open and equal discussion opportunities. ODF have also been recognized as being efficient and convenient by freeing learners from temporal and geographical constraints (Chen & Chiu, 2008; Schellens & Valcke, 2005; Wever, Schellens, Valcke, & Keer, 2006). In addition, online team interactions tend to draw out quiet team members who rarely speak up when sitting in a traditional classroom, providing shy students the opportunity to speak freely (Calongne, 2002). Hammond (2000) also stated that forums take advantage of the opportunities for informal and social exchange as well as those for sustained reflection afforded by the medium (Masters & Oberprieler, 2004). Among online learners, ODF have been recognized as the most frequently and conveniently used online learning activity (Garrison, Anderson, & Archer, 2003). In light of all this, an ODF can be viewed as one of the imperative conditions for online learning.

In order to ensure the success of an ODF, it is essential to institute forum regulations, such as the roles and responsibilities of learners, instructions for posting messages to proper categories/boards, the maximum number of words in a post, the type of content allowed, formats for attached files, and the deadline of a discussion topic (Palloff & Pratt, 1999). With regard to discussion activities, problem-solving strategy can be used to promote participation of a learning community. For instance, the problem solving activity with three steps was designed in the study (Hou, Sung, & Chang, 2009). First, the teachers provide lectures. The second step is the learners' writing project. Last is the Q&A discussion. Hou, Sung, & Chang (2009) also conclude that teachers should make timely interventions in an ODF in order to guide students and improve their critical-thinking skills using a problem-solving strategy. To ensure an ODF have fervent discussion, the conceptual model of intention to participate in ODF has become increasingly important (Yang, Li, Tan, & Teo, 2007).

Although learning forums seem to be helpful to learners, the improvement of learning performance depends on the degree of learners' participation and roles (Davies & Graff, 2005; Chang, Chen, & Wang, 2011). Moreover, online learners must efficiently manage their time in order to manage the load and quantity of online discussion happening around them. Although mobile technology can improve acceptability of ODF, Stratfold (1998) stated that time stress is the problem which most online learners are confronted with (Chang, 2010). At the same time, instructors also have time stress for providing prompt feedback in online discussions (Stratfold, 1998). Instructors are overloaded, with stress contributed to by the time constraints for responding to the frequent requests in the forums. Palloff and Pratt (1999) indicated that the key factor of success in performing an ODF is to respond to questions rapidly (Palloff & Pratt, 1999). Jonassen (1999) stated that the assistance and guidance of instructors has an impact on the success of learning communities. However, the working burden of instructors is not only heavy but also time-consuming (Kearsley, 2000). One of the difficulties and challenges in an ODF is how to keep learners participating in the discussion or query (Kearsley, 2000). Therefore, in order to solve the problem and not to leave any learner's question for too long without being replied to, the study applies Queuing Theory to determine the optimal number of teaching assistants needed for a learning forum.

As each assistant is only capable of answering a limited number of questions, the number of assistants needed is determined based on the number of questions submitted, which could be significantly different from day to day. In addition, to encourage students to participate in the learning forum and join the discussions, the unanswered questions need to be fewer and the average response time needs to be shorter; at the same time, the number of assistants should be as small as possible in consideration of the human resource costs. Therefore, it becomes a challenging issue to determine the number of assistants, taking all of these requirements into account. To cope with this problem, the first research problem is to find out the acceptable waiting time before a message is responded to. Although the acceptable time interval differs from person to person, the study tried to determine the response time interval that satisfied more than 60% of learners. The first research question of this study is:

1. Can the threshold of the response time be determined so that more than 80% learners can accept it in the forum?

   Then, the study used a queuing theory to model the interactive dynamic of a learning forum. A queuing method (M/M/4):(FCFS/∞/∞) was proposed to predict the balancing strategy so that there are assistants who can provide learners with adequate responses to prevent them from digressing before they lose their patience or interest in waiting for feedback, and even cease participating. Therefore, the second research question of this study is:
2. When few teaching assistants are allocated, do all questions get responses within acceptable time? The number of teaching assistants is determined by the queuing model.

   Finally, a learners' satisfaction survey was conducted to validate the queuing model. Hence, the last hypothesis of this study is:
3. Do few teaching assistants provide adequate interactions? In other words, there should be no significant difference of learners' perceived of usefulness and satisfaction after reducing the number of teaching assistants properly.

Table 1 outlines the relationships of the three issues in the study.

Table 1. Relationships among research problems, limitations, and solutions.

Problem	Limitation	Solution
Acceptable response time	More than 80% learners agree	Preliminary survey
Minimum teaching assistants	All responses within time constraint	Queuing theory
Adequate Interactions	Perceived of usefulness	Satisfaction survey

Acceptable Response Time Determination

An ODF provides quick and easy communication, but a learning forum is not a synchronous tool. Instead, learners can take their time before responding a message. Although learners can share ideas and experiences in a learning forum, they are encouraged to ponder on messages that are permanent, asynchronous, and enabling sustained reflection (Hammond, 2000). A forum is the bridge among three characteristics, which are personal experience, theoretical insight, and circumstances. One of the key factors to facilitate reflection in an learning forum is the role of the instructor or assistant (Seale & Cann, 2000), who is not only a respondent to the questions but also an encourager in the forum (Hew & Cheung, 2008; Tagg & Dickson, 1995). It is indicated that encouragement to students can be provided by delivering a continual facilitator presence. For example, rapid and subsequent response to students' questions or comments within an average of three days makes them feel highly respected and encouraged (Hew & Cheung, 2007; Tagg & Dickson, 1995). In addition, one of the most significant features of an ODF is to offer asynchronous distributed collaboration across geographic and international boundaries. Related studies have shown that people mainly focus on the roles of information seekers, information givers, evaluators, and encouragers (Chandler, 2001); furthermore, negotiation and coordination are vital to the success of any online collaboration. Schrire (2006) also found that the achievement of synergistic interaction in computer conferencing leads to deeper learning. The findings support social constructivist approaches to learning.

Many studies also used a learning forum for other major purposes instead of interaction. For instance, Chen and Chiu (2008) showed that teachers could use and manage online discussions at the message level to promote critical thinking, facilitate discussions of controversial topics, and reduce status effects. Schellens and Valcke (2005) also showed that students process information at high cognitive levels during online discussions. That is, online discussion can promote active and critical thinking because it allows more opportunities for students to prepare, reflect, think, and search for extra information before participating in the discussion (Chen & Chiu, 2008; Pena-Shaff & Nicholls, 2004). Although many investigators have explored how satisfied distance learners are with the feedback or support provided, a report by the British Council indicated that nearly two thirds of respondents (64%) were either dissatisfied or very dissatisfied (Sampson, 2003). That report indicates that to institute sufficient student support services for advice/counseling, tutoring, and assessment, feedback is a key issue to satisfying the needs of distance learners.

Ideally an instructor would not leave any question unanswered after a period of two weeks, (Mazzolini & Maddison, 2007), especially for an Inquiry Learning Forum (ILF), in which the role of the instructor or assistant is unlike that in a general online discussion forum. The intervention of instructors or assistants is essential in ILF, although the participation of instructors is not the only indicator of the quality of forum discussions (Mazzolini & Maddison, 2003). Moreover, assistants who frequently make prompt replies are usually recognized as being more enthusiastic and professional. If the assistant or the instructor does not respond rapidly to the questions submitted by the students, the number of students who are willing to discuss in the forum might be significantly reduced. Therefore, the role of an instructor or an assistant as a main facilitator in learning forums is very important if the construction of the forum aims at providing a problem-solving area for the students.

Previous study reported that rapid and subsequent response to students within an average of three days makes them feel highly respected and encouraged (Hew & Cheung, 2008). This study investigated the opinions of the participating students and also found that most of them felt that an acceptable waiting time is about two to three days, as shown in Figure 1. Although two days should be a better choice (81.84%), the threshold of the acceptable wait time in this study is set to 72 hours (i.e. 3 days). In Figure 1, it can be seen that at least 60% of the students can be satisfied when the threshold is reached. However, a waiting time of more than 72 hours may cause much dissatisfaction. In addition, the working time of an assistant, who is usually a graduate student, is four hours per week. The mean response time spent on each question is about half an hour. The viewpoint of the assistants was also investigated in this study, and it was found that dealing with a request or question takes an assistant half an hour on average. By taking these factors into consideration, the M/M/4 queuing model is employed to evaluate the balance between the number of assistants and the waiting time of requests submitted by the students. In other words, four teaching assistants were employed at the beginning. The queuing theory uses mathematical formula to simulate messages arriving at the queue (the learning forum), waiting in the queue (unanswered messages), and being served by the servers (teaching assistants) at the front of the queue. The queuing model and the equations will be explained in the following section.

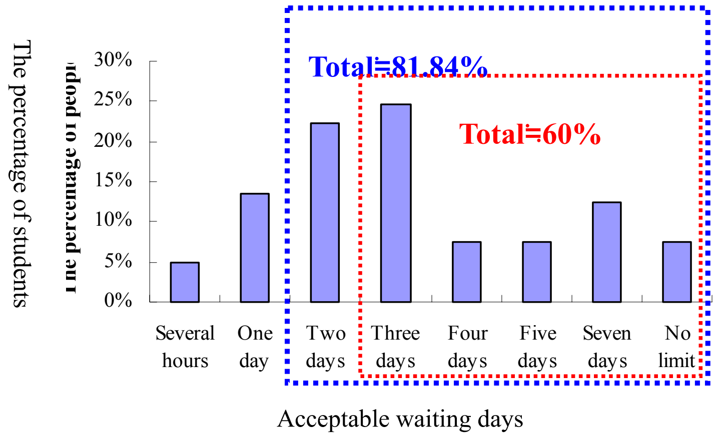

Figure 1. Acceptable wait time according to participants.

Queuing Theory Model for Teaching Assistant Allocation

For the purpose of facilitating students joining in the learning forum, the waiting time for responses to their requests should be as short as possible. Nevertheless, each assistant only works for a limited amount of time and is only capable of answering a limited number of questions. On the contrary, although having many assistants can solve the problem of answering questions, human resources and wages will be wasted. To cope with this problem, we propose a Queuing method which uses the balancing strategy. Queue Theory has been applied to solve various complex problems in the past. There have been many real-life examples of applying the Queuing method for management, such as department stores, passport control booths in airports, or other service systems (Itai, Rodeh, & Shachnai, 2002). For example, Itai, Rodeh, and Shachnai (2002) investigated the passport control problem of dynamic arrangement of the queues in a service system where each server can be in either an active or an inactive mode. In order to balance the load of the service system, the customers were assigned to the queues to minimize the maximum wait time of a customer in each active station. Due to the popularity of the Internet, Queuing Theory has been frequently applied to the task assignment problems in the distributed client/server environments (Squillante, Xia, & Zhang, 2002; Yin, Dai, Li, & Xi, 2007). For example, Son and Kim (2004) employed the Queuing method to determine the optimal number of servers for on-line request processing when multiple identical servers were provided, such that several criteria, including fast response time, high fault-tolerance, and continuous availability, were taken into consideration. In the following sections, the problem formulation and the approach to determining the optimal number of teaching assistants to meet the multiple requirements is proposed, and the experiment results of applying the innovative approach are presented.

The service discipline in this study is the FCFS (First Come First Served) scheme. The waiting model is one line and multiple servers in an infinite population, which is shown as (A/B/C): (FCFS/∞/∞), where A is the distribution of inter-arrival times, B is the distribution of service times, and C, which is finite in this study, represents the number of assistants who provide the service. A and B can be M (Markovian), D (Deterministic) or G (General). In this study, A and B are both Poisson distribution (i.e. Markovian arrival processes) because a number of messages posting to a learning forum in a fixed period of time occurs with a known average rate and independently of the time since the last message posted. Therefore, the queuing model is (M/M/4): (FCFS/∞/∞) assuming C is 4 (i.e. four teaching assistants). The number of requests or questions is conventionally infinite, which is represented as '∞'. In addition, it is assumed that the arrival times of the requests follow a Poisson distribution, and the service times are in Exponential distribution. Relevant parameters of this model are defined and interpreted in the following.

- λ (the mean of student request-submitting rate). When the mean of the submission rate is λ, the mean interval of arrival time is $1/\lambda$. That is, the greater the number of request submissions, the greater the parameter λ and the probability of submitting n requests. Therefore, while the number of request submissions in the system is n, the mean arrival rate of the requests is $\lambda_n = \lambda$. (n=0,1,…).

- μ (the mean service rate of the assistants). When the mean of the service rate of an assistant is μ (the number of times of providing service in an hour), the mean of the assistant's service time is 1/μ. While the number of request submissions in the system is n, the mean service rate of the assistants is μ_n. As the service time is in exponential distribution and n is infinite, we have $\mu_n=n*\mu$ (for n <c ,where c is the number of assistants) if the number of requests is smaller than the number of times service is provided by the assistants; otherwise, we have $\mu_n=c*\mu$ (for n □c) if the number of requests is larger than the number of times service is provided by the assistant and there are some requests which must wait. Symbol c represents the number of assistants, which means the most number of times service can be given at the same time. In this study, we have the following sequence: μ, 2μ, 3μ, 4μ, 4μ, 4μ, ...
- ρ (the utilization ratio). ρ=λ/cμ, and the idle ratio is (1-ρ). If ρ>1, the service is unstable; in other words, the number of assistants is not enough to handle all of the requests (the waiting probability is 100%). When ρ is convergence (ρ<1), the service is stable, and the service status can be calculated by applying the following formulas.

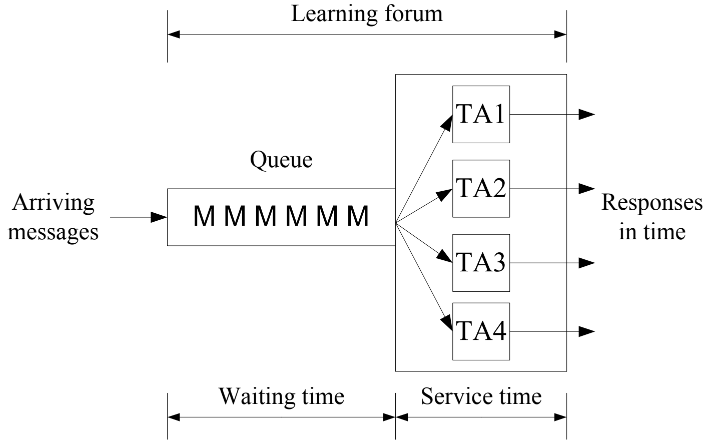

Figure 2. Interaction model of a learning forum on queuing theory.

Figure 2 illustrates the model of a learning forum based on the queuing theory. The model is restricted to two conditions. First is the FCFS discipline. Second is the service is stable (i.e. ρ<1). The expected response time, denoted as ET, is equal to expected waiting time (denoted as EW) plus service time (1/μ). Hence, the evaluation function of the mean time that each request spends before getting feedback is

$$ET = EW + \frac{1}{\mu} \tag{1}$$

In other words, the ET of equation (1) should be less than 72 hours in this study. However, the expected waiting time of equation (1) depends on the expected number of requests in the waiting queue, denoted as L_q. If we can find L_q, the EW of equation (1) can be calculated by EW = L_q/λ. To model the L_q, the probability of n messages in the queue is first denoted as P_n. Then, the L_q can be represented as the following equation (2) based on the assumption of four teaching assistants (i.e. C is 4).

$$L_q = P_5 + 2*P_6 + 3*P_7 + 4*P_8 + 5*P_9 \ldots \tag{2}$$

There will be only one message in the waiting line when five messages were posted into the learning forum. Because there are four teaching assistants, the probability of P_1, P_2, P_3 and P_4 is zero. If a steady state exists, we obtain the following balance equations, including $\mu P_1=\lambda P_0$, $2\mu P_2=\lambda P_1$, $3\mu P_3=\lambda P_2$ and so on. Equation (3) can be derived from equation (2) by substituting for those balance equations.

$$L_q = \frac{(\lambda/\mu)^c \rho}{c!(1-\rho)^2} P_0 \quad \text{, when } \rho<1 \text{ and n is infinite.} \tag{3}$$

Hence, the logical first step of the problem is to solve P_0 (i.e. the probability of no request submitted to the system). The derivations of equation (4) can be found in the book, Fundamentals of Queueing Theory (Gross & Harris, 1998).

$$P_0 = 1/\left(1+\sum_{n=1}^{c-1}\frac{C^n\rho^n}{n!}+\frac{C^c\rho^c}{C!(1-\rho)}\right), \text{ when n is infinite and } \sum_{n=0}^{\infty}P_n = 1.\ (M/M/C/\infty) \qquad (4)$$

Adequate Interaction Validation

To evaluate the performance of the Queuing model, an ODF for learning by asking in a vocational senior high school was employed in the Concepts of Computer Science course, and the data of the forum was analyzed by applying our innovative approach. The students attended three hours in a traditional classroom every week. After class, the students could ask questions in the learning forum. There were 40 vocational high school students participating in the learning forum. There were two experimental stages and the duration of each stage was four weeks. After each forum activity stage, the participant feelings of the learning forum, including the perception-of-usefulness and the perception-of-satisfaction with the response wait time were investigated using a questionnaire revised from TAM (Technology Acceptance Model). There were 3,042 records in the forum at the end of the eight weeks. One hundred and seventeen questions were asked and discussed.

The learning forum was implemented in a Moodle system shown as the right part of Figure 3. There were 94 questions with correct responses and, 23 questions with incomplete answers on the day the experiment ended. The system flow to respond in time is shown as the left part of Figure 3. After a student asked a question in the learning forum, the question would be pushed into the queue where it would wait for a teaching assistant or peer to respond to it. If a question was not responded to or solved, it would be pushed back into the queue again, depicted as two diamond symbols in Figure 3. The dotted lines connect the system flow with examples in system implementation to demonstrate the processes of the Queuing theory model. Among the replies, 18% were provided by other students (i.e. peers) in the forum, while 82% were given by the assistants. From the records of the system database, the mean of questions received per week was about 15 messages (i.e. posts) in the learning forum.

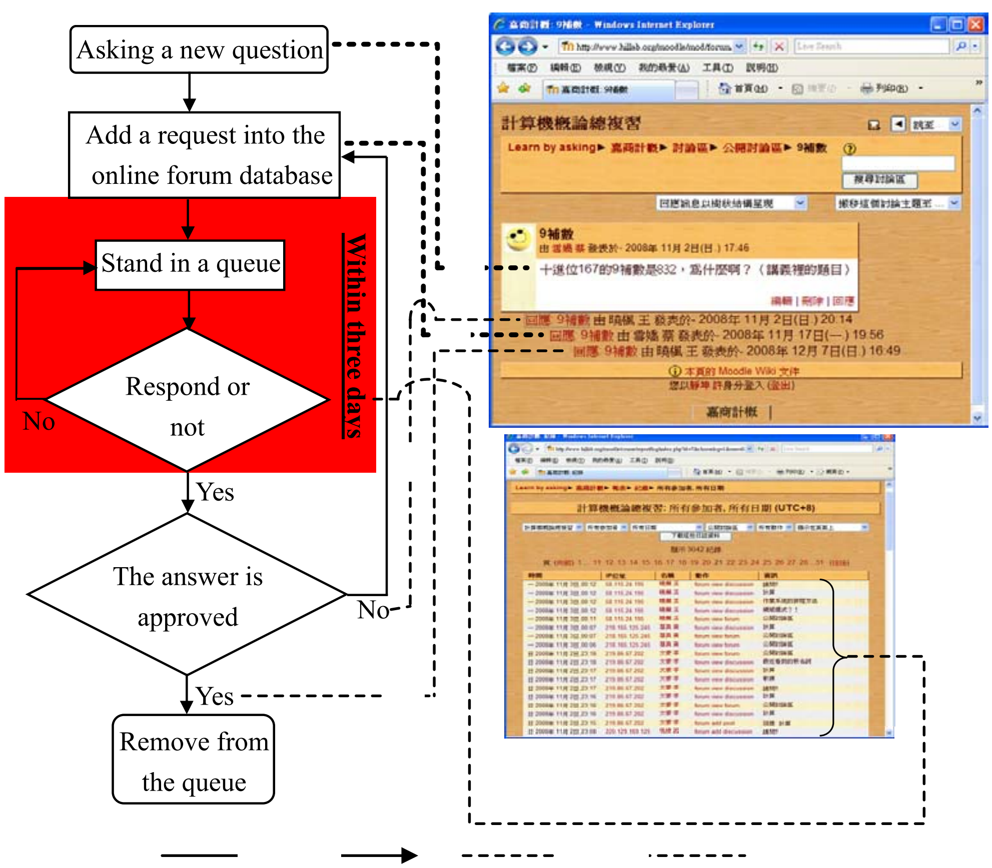

Figure 3. System flow and implementation to provide adequate interaction.

Use Queuing Model to Analyze Results

As an assistant serves 4 hours per week and the cost of an assistant is about thirty USD (one thousand New Taiwan dollars) per week, it is essential to appraise the statistics for a multi-serving of assistants by M/M/C because too many assistants will waste human resources, while too few assistants will affect the service quality in the learning forum. By employing Lingo (a simulation program), the parameters of the M/M/C model with an infinite population can be obtained, as shown in Table 2 where C represents the number of assistants, P_0 represents no message in the queue, EW represents expected waiting time, ET represents expected time, and L_q represents expected number of questions in the queue.

Table 2: The evaluation of response time by Queueing model (M/M/C) :(FCFS/∞/∞) for learning forum

C	P	P_0	EW	ET	L_q	Pwait= @PEB(arrival,servers)
1	Unstable	●	●	●	●	●
2	Stable	0.0322580	0.9072581	1.032258	15.48387	0.9072581
3	Stable	0.1322314	0.4030440	0.486377	2.52066	0.3873967
4	Stable	0.1492353	0.0085097	0.133509	2.00264	0.1446660

The anticipation results show that the mean expected response time in the M/M/3/∞ model is 3.404639 days (ET=0.486377 week) whereas the expected response time in the M/M/2/∞ model, which is 7.225806 days (ET=1.032258 week), is more than a week. Moreover, the expected waiting time in the M/M/2/∞ model, which is 6.3508067 days (EW=0.9072581 week), is more than the expected waiting time in the M/M/3/∞ model, which is 2.821308 days (EW=0.403044 week). The expected waiting time in the M/M/3/∞ model is just below our acceptable response time although its expected response time is a little bit higher than the threshold. Consequently, the result recommends that it would be better to hire three assistants because the expected waiting time of the requests is fewer than three days, which is acceptable. In fact, based on the Queueing theory prediction, the expected request wait time will be less than one day if there are four part-time teaching assistants.

From the viewpoint of educators, both the frequency and the quality of the interactions between instructors and students are important factors in learning forums. In order to ensure that the request channel is unobstructed and the wait time for replies is within a tolerable range, the Queuing approach was introduced in the experiment. When it is supposed that the number of requests is unlimited in Figure 4, the dotted lines are the cost of human resources, which increase as the working days and the number of people increase. In contrast, the object lines are the probability of the request wait time in the three situations, which decreases when the number of assistants increases. It can be seen that the determination of the number of assistants and the service quality is a trade-off. Furthermore, in practical applications, the factors for predicting the number of assistants and the expected request wait time can be much more complex. For example, different assistants who work in different time zones scales might give more diverse results.

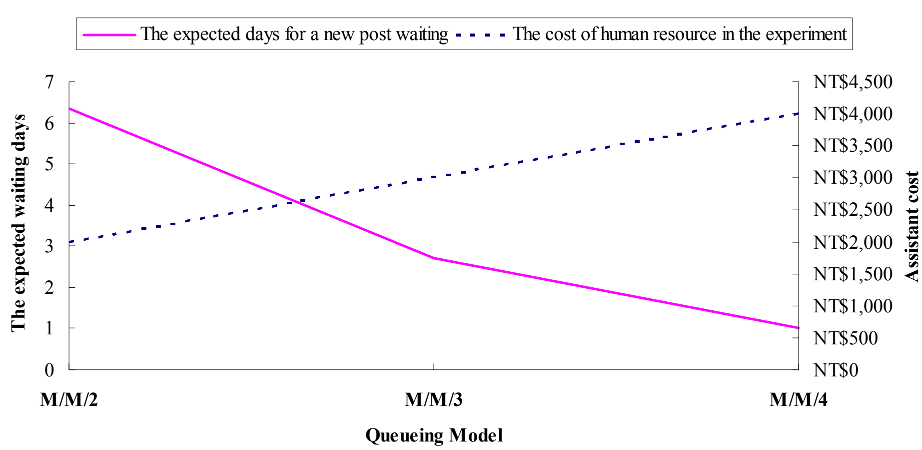

Figure 4. The relationship among number of assistants, waiting time, and cost-effectiveness.

Validate Prediction of Queuing Model by Survey

This study not only provided a place for students to ask any question about the concepts of computer science, but also hired assistants to answer the questions. Widanski (2003) recommended learning through asking questions. He said that the hours spent in the classroom are merely part of the real work of learning. His classroom research showed that good students ask more questions and learn more (Widanski, 2003). One of Widanski's basic assumptions is that all learners' questions got responses. It was found that most of the questions were solved by the assistants, but nearly 18% were discussed and solved by the students themselves. All of the topics were related to the concepts of computer science. In other words, the students did not use the forum to chat about other topics. The forum therefore achieved the goal of providing an assisted learning platform for asking questions outside the classroom. The main language used in the forum was Chinese.

Based on the queuing model, both of M/M/4 and M/M/3 can fit the research assumption that is to answer a response within three days. The practical issue of this study is whether learners can accept having fewer teaching assistants or not. To test the hypothesis, an experiment of measuring learners' acceptance was conducted. There were two experimental stages. In the first stage, four assistants were allocated to the forum during the first four weeks. In the second stage, three assistants were allocated, and every assistant served four hours a week during the two experimental stages. The question of interest was whether the forum contributions would become lower or whether the students would feel that they had to wait too long for responses as a result of the reduction in assistant numbers. There was an in-depth investigation after each experimental stage.

In order to ensure that applying the queuing model to allocate the number of assistants did not have obvious side effects, such as reducing the interest or satisfaction of the learners, the questionnaire that was revised from TAM was used to investigate the participants after each experimental stage. To ensure reliability of the tool, the fourth item in original TAM was deleted to make the Cronbach's alpha increase from 0.844 to 0.906. The internal consistency of the satisfying part can be accepted (Cronbach's alpha is 0.886). The items in the questionnaire use a 7-point Likert scale, where 1 = strongly disagree and 7 = strongly agree. The number of assistants in the second experimental stage was recommended by the predicted results of the Queuing approach. The number of assistants hired in the first stage was greater than the number of the prediction result. The number of valid questionnaires acquired in both experimental stages was 34. The participants in the first experimental stage were the same as those in the second experimental stage. It was found that there was no significant difference between the first stage and the second stage in terms of the perception-of-usefulness ($0.096 > 0.05$) and the perception-of-satisfaction ($0.374 > 0.05$) according to the paired-sample T tests, as shown in Table 3.

Table 3: The paired-samples T test after reducing the number of teaching assistants.

	Perceived-of-Usefulness		Sig.	Perceived-of-Satisfy		Sig.
	Mean	Std.	(2-tailed)	Mean	Std.	(2-tailed)
First experimental stage (4 teaching assistants)	4.79	0.862		4.41	1.365	
Second experimental stage (3 teaching assistants)	4.58	0.944	0.096	4.22	1.008	0.374
	Non-significance			Non-significance		

Accept hypothesis

CONCLUSIONS

The popularity of the Internet has encouraged educators to pay more attention to the behaviors and effects of learning communities in cyberspace. Many teachers or assistants use the Internet as a medium to interact with students, including answering requests or questions submitted by students online. An ODF is one of the most popular tools on the Internet for teachers and assistants to interact with students asynchronously. In recent years, an increasing number of teachers have been using learning forums in the courses they teach. Since the number of requests or questions submitted by students might be large, to promptly respond to the students, it would be necessary for teachers to hire an appropriate number of assistants to help them answer the students in a timely fashion. In this study, the Queuing approach was applied to determine the appropriate number of assistants needed, taking the number of requests and the cost of human resources into consideration. As part of our study an experiment on a vocational high school class was conducted to demonstrate our innovative approach. The results show that the assistant number predicted by the approach did satisfy the demands of the learners. For future research, we plan on considering more factors, including the different costs for hiring assistants with different backgrounds in different time zones, various arrival rates of requests in different time zones, and the difficulty of individual requests.

ACKNOWLEDGEMENTS
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REFERENCES
Calongne, C. M. (2002). Promoting Team Interaction in the Online. *Journal of Computing Sciences in Colleges, 18*(1), 218-227.
Chandler, H. E. (2001). The Complexity of Online Groups: A Case Study of Asynchronous Distributed Collaboration. *ACM Journal of Computer Documentation, 25*(1), 17-24.
Chang, C. K. (2010). Acceptability of an asynchronous learning forum on mobile devices. *Behaviour & Information Technology, 29*(1), 23 – 33.
Chang, C. K., Chen, G. D., & Wang, C. Y. (2011). Statistical model for predicting roles and effects in learning community. *Behaviour & Information Technology, 30*(1), 101-111.
Chen, G., & Chiu, M. M. (2008). Online Discussion Processes: Effects of Earlier Messages' Evaluations, Knowledge Content, Social Cues and Personal Information on Later Messages. *Computer & Education, 50*(3), 678-692.
Collison, G., Elbaum, B., Haavind, S., & Tinker, R. (2000). *Facilitating Online Learning: Effective Strategies for Moderators.* Madison: WI: Atwood Publishing.
Davies, J., & Graff, M. (2005). Performance in e-learning: online participation and student grades. *British Journal of Educational Technology, 36*(4), 657-663.
Gates, B., Myhrvold, N., & Rinearson, P. (1995). *The Road Ahead*. New York: Viking Penguin.
Gross, D., & Harris, C. M. (1998). Fundamentals of Queueing Theory (Wiley Series in Probability and Statistics). Wiley-Interscience.
Hammond, M. (2000). Communication within On-line Forums: the Opportunities, the Constraints and the Value of a Communicative Approach. *Computer & Education, 35*(4), 251-262.
Garrison, D. R., Anderson, T., & Archer, W. (2003). A theory of critical inquiry in online distance education, in: M.G. Moore, W.G. Anderson (Eds.), *Handbook of Distance Education* (pp. 113–128), Laurence Erlbaum, London.
Hew, K. F., & Cheung, W. S. (2008). Attracting Student Participation in Asynchronous Online Discussions: A Case Study of Peer Facilitation. *Computer & Education, 51*(3), 1111-1124.
Hou, H. T., Sung, Y. T., & Chang, K. E. (2009). Exploring the behavioral patterns of an online knowledge sharing discussion activity among teachers with problem-solving strategy. *Teaching and Teacher Education, 25*(1), 101-108.
Itai, A., Rodeh, M., & Shachnai, H. (2002). The Passport Control Problem or How to Keep a Dynamic Service System Load Balanced? *Theoretical Computer Science, 282*(2), 303-318.
Jonassen, D., Peck, K., & Wilson, B. (1999). *Learning with Technology - A Constructivist Perspective.* Upper Saddle River: NJ: Prentice Hall, Inc.
Kearsley, G. (2000). *Online Education: Learning and Teaching in Cyberspace*. Belmont: CA: Wadsworth/Thomson Learning.
Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge: Cambridge University Press.
Masters, K., & Oberprieler, G. (2004). Encouraging Equitable Online Participation through Curriculum Articulation. *Computer & Education, 42*(4), 319-332.
Mazzolini, M., & Maddison, S. (2003). Sage, Guide or Ghost? The Effect of Instructor Intervention on Student Participation in Online Discussion Forums. *Computer & Education, 40*(3), 237-253.
Mazzolini, M., & Maddison, S. (2007). When to Jump in: The Role of the Instructor in Online Discussion Forums. *Computer & Education, 49*(2), 193-213.
Palloff, R., & Pratt, K. (1999). *Building Learning Communities in Cyberspace: Effective Strategies for the Online Classroom*. San Francisco: Jossey-Bass.
Pena-Shaff, J. B., & Nicholls, C. (2004). Analyzing Student Interactions and Meaning Construction in Computer Bulletin Board Discussions. *Computer & Education, 42*(3), 243-265.
Sampson, N. (2003). Meeting the Needs of Distance Learners. *Language Learning & Technology, 7*(3), 103-118.
Schellens, T., & Valcke, M. (2005). Collaborative Learning in Asynchronous Discussion Groups: What about the Impact on Cognitive Processing? *Computers in Haman Behavior, 21*(6), 957-975.
Seale, J. K., & Cann, A. J. (2000). Reflection On-line or Off-line: the Role of Learning Technologies in Encouraging Students to Reflect. *Computer & Education, 34*(3-4), 309-320.
Son, J. H., & Kim, M. H. (2004). An Analysis of the Optimal Number of Servers in Distributed Client/Server Environments. *Decision Support Systems, 36*(3), 297-312.

Squillante, M. S., Xia, C. H., & Zhang, L. (2002). Optimal Scheduling in Queueing Network Models of High-Volume Commercial Web Sites. *Performance Evaluation, 47*(4), 223-242.
Stratfold, M. (1998). Promoting Learner dialogues on the Web. In M. Eisenstadt & T. Vincent (Eds.), *The Knowledge Web: Learning and Collaborative on the Net*. London: UK: Kogan Page.
Widanski, B. B. (2003). Learning Through Asking Questions. Association for University Regional Campuses of Ohio (AURCO) Journal, 9, 169-174.
Wever, B. D., Schellens, T., Valcke, M., & Keer, H. V. (2006). Content Analysis Schemes to Analyze Transcripts of Online Asynchronous Discussion Groups: A Review. *Computer & Education, 46*(1), 6-28.
Yang, X., Li, Y., Tan, C. H., & Teo, H. H. (2007). Students' participation intention in an online discussion forum: Why is computer-mediated interaction attractive? *Information & Management, 44*(5), 456-466.

REEXAMINING THE EFFECTIVENESS OF VOCABULARY LEARNING VIA MOBILE PHONES

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ABSTRACT
The purpose of this study is to reexamine the effectiveness of vocabulary learning via mobile phones. Students (N=78) from two intact classes of sophomores at a Chinese university were assigned to two groups: the SMS group (the experimental group) and the paper group (the control group). Then, they were administered a pretest to identify the level of their prior vocabulary knowledge. The results revealed that there was no significant difference (p>.05) between the SMS group (Mean=33.34, SD=14.30) and the paper group (Mean=37.13, SD=15.21). Next, they were put into two intervention conditions. The SMS group studied a selected list of vocabulary via mobile phone SMS text messages while the paper group worked on the same list of vocabulary through paper material in a self-regulated manner. Results showed that there was a significant difference (p<.05) in the posttests but not in the delayed tests (p>.05) between the two groups. The study concludes that vocabulary learning through these two methods is effective in their own way and that a blended approach to vocabulary learning may better help increase the effectiveness from the perspective of sustained retention rates. Finally, the limitations of this study and suggestions for future studies are discussed.
Keywords: vocabulary learning; mobile phones; short text messages; mobile learning

1. INTRODUCTION

Vocabulary learning is crucially important for foreign or second language learners' fluent communicative ability. As Wilkins (1972) put it, "without grammar very little can be conveyed, without vocabulary nothing at all can be conveyed" (p. 111). Harmer (1994) also echoed, "[I]f language structures make up the skeleton of language, then it is vocabulary that provides the vital organs and the flesh" (p. 153). Increasingly, attention to vocabulary has been an integral part of the learning process for foreign language learners. This is particularly true for Chinese English language learners, who view vocabulary learning as the most important part of their linguistic competence enhancement (Gui, 2006). It has become a phenomenon that vocabulary books or software applications can easily become one of the bestsellers in China as almost every student has a copy of a vocabulary book and they usually spend considerable time each day on intentional English vocabulary learning within their four academic years in college and beyond, in the hope that they can speed up the pace of their vocabulary development.

Generally speaking, vocabulary learning can be categorized into two kinds: intentional and incidental. Intentional vocabulary learning refers to "any activity aiming at committing lexical information to memory" (Robinson, 2001, 271). It involves "invest[ing] the necessary mental effort and memoriz[ing] the words until [learners] know their meanings" (Koren, 1999, p. 2). This is in contrast to incidental vocabulary learning, which refers to vocabulary learning as "a byproduct of something else" (Gass & Selinker, 2001, p. 379) such as reading a passage for comprehension, listening to news for local, national or international events, etc. Even though there have been louder voices acclaiming the effectiveness of incidental vocabulary learning (Chen, 2006; Coady, 1997; Krashen, 1989; Nagy, 1997; Nation, 1990), discordant voices have also been heard (Estes & DaPolito, 1967; Horst, Cobb, & Meara, 1998; Hulstijn, 1992; Hulstijn, Hollande, & Greidanus, 1996; Koren, 1999).

For example, Koren (1999) points out that "incidental vocabulary learning is not particularly efficient, as shown by the literature. Therefore, intentional learning should rather be encouraged" (p. 15). In an experimental study of the effectiveness of incidental and intentional vocabulary learning, Hulstijn (1992) found that the intentional learning group outperformed the incidental group. His findings are also supported by Mondria and Wit-de Boer (1991). Barcroft (2009)

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conducted a recent experimental study of intentional vocabulary learning in terms of the relationship between strategy use and vocabulary learning performance and concluded that students can learn better when using a mnemonic technique and L2-picture association than L2-L1 translation and repetition. When discussing the effectiveness of Chinese learners' intentional and incidental vocabulary learning, Zhao (2007) posited that intentional learning should be encouraged to help increase the vocabulary of non-English-major students who usually have a relatively smaller vocabulary. He also argued that the effectiveness of intentional learning can be enhanced when it is complemented with incidental learning.

Over the past few years, studies of vocabulary learning in second/foreign languages can be roughly divided into two kinds: vocabulary learning with technology and without technology. Quantitatively, the second category is by far the most numerous (e.g., Bloom & Shuell, 1981; Carter, 1987; Cohen, 1987; Crow, 1986; Fraser, 1999; Gass, 1988; Harmon & Hedrick, 2005; Hulstijn, Hollander, & Greidanus, 1996; Holley, 1973; Jenkins, Stein, & Wysocki, 1984; Judd, 1978; Kasper, 1993; Kempe, Brooks, & Christman, 2009; Kojic-Sabo & Lightbown, 1999; Laufer, 2009; Laufer & Girsai, 2008; Laufer & Hulstijn, 2001; Min, 2008; Nation, 2001; Papagno, 1991; Parry, 1991; Prince, 1996; Read, 2004; Singleton, 1997; Sonbul & Schmitt, 2009; Tinkham, 1997; Tseng, Dörnyei, & Schmitt, 2006; Tseng & Schmitt, 2008; Waring & Nation, 2004; Webb, 2007, 2008). These researchers address the issue of vocabulary learning more from the perspective of mnemonic devices, learning strategies, the impact of reading, the role of context, as well as syntactic and thematic analysis.

Notwithstanding, technology-based studies, more specifically the studies of vocabulary learning with computer-mediated communications (CMC) technologies, are well represented (e.g., Al-Seghayer, 2001; Chun & Plass, 1996; Cobb, 1999; Grace, 1998; Groot, 2000; Horst, Cobb, & Nicolae, 2005; Hulstijn, 2000; Jones, 2003, 2006; Jones & Plass, 2003; Koren, 1999; Luk & Ng, 1998; Loucky, 2003; Nakata, 2008; Okuyama, 2007; Svenconis & Kerst, 1994; Tsoua, Wang, & Li, 2002; Yeh & Wang, 2003; Yoshii & Flaitz, 2002). These studies have revealed a number of encouraging results, which demonstrate that vocabulary learning with computers can be more effective than through the use of traditional learning methods (Tsoua, Wang, & Li, 2002), or traditional tools such as dictionaries (Luk & Ng, 1998) and vocabulary lists (Nakata, 2008), just to name a few.

Compared to CMC, only a handful of studies have investigated in any depth the pedagogical use of mobile phones for vocabulary learning (e.g., Cavus & Ibrahim, 2009; Levy & Kennedy, 2005; Kennedy & Levy, 2008; Lu, 2008; Song, 2008; Stockwell, 2007; Stockwell, 2010; Thornton & Houser, 2001; Thornton & Houser, 2005). Vocabulary learning with mobile phones allows learners to be exposed to spaced repetition of vocabulary items, which is believed to be more effective than massed repetition (Nation, 2001), as in the case of traditional book-based self-regulated vocabulary learning. Such findings have been proven by Bloom and Shuell's empirical study (1981) of two groups of students (N=56) in learning French vocabulary words. The students were randomly assigned to two treatment situations: the experimental group with distributed (spaced) practice and the control group with massed practice. The posttest results did not show a significant difference between the two groups, but the results of the delayed test four days after the experiment revealed that the group with spaced practice performed significantly better than the group with massed practice. It is posited that this difference stems from the fact that the experimental group had the opportunity of "practicing [both] the vocabulary words themselves … [and] their recall from long-term memory" (Bloom & Shuell, 1981, p. 247) while the control group could "only have the opportunity to recall information from short-term memory during learning" (p. 247).

However, such findings are contradicted by Lu's (2008) findings when mobile phone usage is involved.
In her experimental study, students (N=30) were assigned to two intentional vocabulary learning conditions. In one condition, there were 15 students who used mobile phones for spaced target vocabulary learning and another 15 students who utilized print material for massed learning of the same vocabulary words. Each group learned 14 words under one learning condition for one week, and then switched conditions and learned another 14 words the following week. The posttest results show that the mobile phone groups performed better than the paper groups in terms of vocabulary gains within such a one-week learning period. However, the delayed tests revealed that vocabulary gains remained the same across the two conditions.

The findings are to some extent in line with those of some of the recent studies of vocabulary learning with mobile phones. Thornton and Houser (2005) made a comparative study of the effectiveness of vocabulary learning through email and via mobile phones, revealing that the mobile phone group had achieved more vocabulary gains than both the email group and the group who used paper materials as a medium of vocabulary delivery. They concluded that this medium of mobile phones can "capture their interest, and pushing study opportunities at students via mobile e-mail is effective in helping them acquire new vocabulary" (p. 226).

Başoğlu and Akdemir (2010) conducted a comparative study of vocabulary learning with mobile phones and with paper flashcards. The experimental group used the vocabulary program on the phones to study the target words for six weeks in their extracurricular hours while the control group worked on the same words on paper flashcards during the same time span. Their findings reveal that “vocabulary learning programs running on mobile phones improved students’ acquisition of English vocabulary more than traditional vocabulary learning tool, flash cards” (p. 6).

Song’s (2008) investigation also lends support to the findings of the previous studies. Song conducted a pilot study of the hybrid use of SMS and the web in vocabulary learning. She found that this mobile technology can help “marginally” improve the participants’ vocabulary learning performance. Her findings were echoed by Cavus and Ibrahim’s (2009) experimental study, revealing that spaced vocabulary learning with mobile phones was effective in terms of helping learners to learn the target English words.

Such effectiveness may be due to the affordances of this technology such as “immediacy in receiving the learning content, flexibility and portability of learning in time and place and very low cost” (Song, 2008, p. 95). Song argued that the use of this mobile technology can motivate learners to learn as well as remind them to work on the required learning tasks. Li (2009) joined Song in arguing that flexibility and motivation afforded by this technology enable learners to learn anywhere and anytime as well as to be more engaged in working on new vocabulary. Levy and Kennedy (2005) also found that this way of learning is beneficial to vocabulary learning in terms of “the impact educationally may reach far beyond the initial message, especially with the more motivated students” (p. 81), for it enables learners to learn beyond the linguistic form. Likewise, Cavus and Ibrahim (2009) concurred that students “expressed their satisfaction and enjoyment of learning away from the classroom with the help of their mobile phones” (p. 88).

Mobile phone technology has the potential to increase learners’ efficiency, especially in situations where self-regulated learners lack the ability to learn well in an autonomous manner (Zhang & Song, 2009). One of the plausible explanations of the above phenomena stems from Channell's (1988) theory on learners’ active role in the process of vocabulary acquisition. In particular, she maintained that "[l]earners should be encouraged to make their own lexical associations [between a learner’s first and second language knowledge] when they are actively learning new vocabulary. (However, at present we do not know which kind of associations are the most useful in aiding retention)" (p. 94). When they are actively engaged in making conscious links, learners tend to give their focal attention to both form and meaning, which is believed to give rise to language acquisition (Kormos, 2006; Schmidt, 2001).

A second explanation, which is in line with Channell's conceptual framework on the active role of the learner, is based on the noticing hypothesis proposed by Schmidt (1990). According to this hypothesis, noticing, which is “the subjective manifestation of attention, and further, that attention is the necessary and sufficient condition for storage in memory” (Alanen, 1995, p. 259), can facilitate input to be processed in short-term memory and to be converted to intake. Schmidt (2001) argued that "noticing requires of the learner a conscious apprehension and awareness of input" (p. 26). It is a necessary condition for language learning to occur and “the first step leading to a deeper information processing” (Pavičić Takač, 2008, p. 75). When they have opportunities to expose themselves to a higher frequency of target words, learners are better able to notice them and have a higher likelihood of integrating them into their developing interlanguage system.

Although most studies have identified the potential and effectiveness of the use of mobile phones in vocabulary learning, less encouraging results have been reported by Stockwell (2007, 2010). The results of both of his studies showed that vocabulary learning via mobile phones was not more advantageous than through desktop computers. No consistent differences were identified in terms of learners’ performance in vocabulary learning with the two technologies. Moreover, in his most recent study, Stockwell (2010) found that contrary to previous studies (e.g., Başoğlu & Akdemir, 2010; Cavus & Ibrahim, 2009; Levy & Kennedy, 2005; Kennedy & Levy, 2008; Lu, 2008; Mcconatha, Praul, & Lynch, 2008) learners and teachers were reluctant to adopt mobile phones for vocabulary learning. This may be due to the costs of the hardware, preference for familiar and proven computer technology, and the shortcomings of the mobile device such as a small key pad and display screen, which result in “a higher cognitive burden” (Stockwell, 2007, p. 380). Nevertheless, he is optimistic about the role of mobile phones in language learning and teaching.

Although previous studies are commendable, two critical parameters merit further investigation. First, existing studies are region-specific and were undertaken outside of mainland China. In such a scenario, learner characteristics may be different, which, accordingly, may result in differences in the performance of learning. Second, previous studies are seriously limited by small sample size, a short learning cycle, as well as small target vocabulary size. In order to address these issues, this study explores the effectiveness of vocabulary learning with mobile technologies from a Chinese students’ perspective. More specifically, it seeks to reexamine whether the use of mobile phone SMS can better enhance students’ English vocabulary learning than the traditional use of print material. This study raises the following research questions:

(1) Is vocabulary learning via mobile phone SMS more effective than the traditional way of learning through the paper medium?

(2) What are the advantages and disadvantages of vocabulary learning via SMS?
(3) How do learners use mobile phones for vocabulary learning?
(4) What are the implications for pedagogical practice?

This study is of significance for three reasons. The results could give rise to a wider effective pedagogical deployment of mobile technologies in language learning, which may again bring forth more in-depth studies of the use of technology in the development of the four language skills. In addition, they can also inform technology-based language program designers and language learning software developers by catering for the needs of language learners. Moreover, they can contribute to the current body of literature relevant to the use of mobile technologies in language education.

2. METHODOLOGY

2.1. Subjects.

Two intact classes of students (N=78) participated in a quasi-experimental study. The students were all self-motivated to improve their vocabulary due to the fact that they all had to take the nationally recognized College English Test (CET), which is normally a pre-requisite for virtually any bachelor's degree program in China. They were from one of China's key universities located in a metropolitan city in North China. The two classes, in which there were 40 (Class A) and 38 (Class B) students respectively, were placed in two treatment scenarios when they embarked on vocabulary learning. Specifically, students in Class A (the experimental group) studied the same vocabulary items in a different manner, namely, with mobile phone SMS text messages and those in Class B (the control group) worked on a given list of vocabulary on paper material. Due to the failure in submitting one or two tests during the experimental period, only 32 students in Class A (M=5, F=26) and 30 students (M=4, F=26,) in Class B had full records of the test results, which were included in later data analysis. The age of the students from Classes A and B ranged from 18 to 21 years old (Mean=19.69, SD=.64) and from 19 to 22 years old (Mean=20.13, SD=.86), respectively.

2.2. Implementation

2.2.1. A TOEFL vocabulary test

The purpose of this test was to determine the subjects' current state of vocabulary knowledge before experiments were launched. In order to identify students' initial vocabulary level, a vocabulary section of a TOEFL test was employed. The section was composed of 30 multiple-choice items, in which a vocabulary word was underlined in a statement and test takers were asked to choose the word in the four choices that had the same meaning as the one underlined in the statement. The results of the test served to identify whether there were any differences in students' initial vocabulary level between the two groups.

2.2.2. Post-intervention vocabulary test

The purpose of the tests was to determine whether the subjects had the same level of vocabulary before an intervention was made, whether vocabulary learning would improve after the intervention was implemented, and whether the subjects had any differences in the level of the target vocabulary after a short period when the intervention was carried out. The vocabulary items originated from the above-mentioned TOFEL vocabulary test. The words (N=130) were extracted from the TOEFL test items the students were expected to learn. This vocabulary list covered pronunciation (indicated in phonetic transcription), part of speech, Chinese translation, and sentence examples containing the word. These were delivered to the subjects of the two groups for learning through two different kinds of media, namely paper material and SMS text messages. Of the total vocabulary, 100 were randomly chosen for testing by placing all the vocabulary in a list numbered through the use of Microsoft Excel function

2.2.3. Written report

Within a one-week period after the posttest was completed, the subjects in the experimental group were asked to make comments on their learning experience in terms of how learning could be better enhanced. The written report covered eight open-ended questions, ranging from effective use of mobile phones for vocabulary learning to its advantages and disadvantages. It was submitted through a learning system after completion.

2.3. Procedures

Two different treatments were given to the two groups in terms of learning 130 words with mobile phones in the experimental group (Class A) and a list of the same words with paper material in the control group (Class B). The list of vocabulary was delivered to the experimental group via SMS, five items at a time on a daily basis, through Fetion, a free messaging software application provided by China Mobile. Bulk messages could be delivered to a group of maximally 32 people at one time, just enough to accommodate the experimental group. In contrast, the vocabulary words were made available to the control group through a face-to-face distribution of the entire list of 130 vocabulary items on sheets of paper at the beginning of the study. Members of the control group determined for themselves the number of words to learn each day, as they would with a vocabulary book in a traditional real-life way of self-regulated vocabulary learning outside of the classroom setting.

For the experimental group, mobile phone numbers were first collected from the subjects with their oral consent. Based on the subjects' preferred times of message delivery gathered prior to the start of this experiment, an SMS message consisting of 5 vocabulary items was sent out on a regular basis twice a day, one during the lunch break at 12 pm and the other during the dinner break at 5:30 pm. Such message delivery lasted 26 days from April 2 to 27, 2009. The group took the posttest at the end of the experiment on April 28.

As indicated previously, the entire 130 item vocabulary list printed on sheets of paper was distributed face-to-face to the control group after it had completed the same TOFEL test and the pretest as the experimental group. This took place the day after the experimental group received its first SMS vocabulary messages due to the fact that the control group had a different class schedule from the experimental group. The control group was instructed to memorize all the vocabulary items on a daily basis in a self-regulated manner within the same period of time as the experimental group. Similarly, a posttest was administered to them one day after the experiment was completed because the group started to work on the list of vocabulary items one day later after vocabulary items were delivered to the experimental group.

Next, both groups were given a delayed test in the fifth week but on a different day (the experimental group on Thursday while the control group on Friday) although the delay for each group remained the same. The test was administered face-to-face and test papers were collected within the given half-an-hour period.

The subjects in the experimental group were also asked to submit a written report on their experiences of vocabulary learning with mobile phones through a learning system within a one-week period. 25 subjects submitted their report, which was used as qualitative data for later analysis.

Preliminary analyses of the results of these tests were performed and the results of any subjects who had failed to show up during the testing period or failed to submit the test papers were excluded from the data. An alpha level of .05 was used for all statistical analyses.

3. RESULTS

3.1 Level of vocabulary knowledge before and after treatments

Table 1 shows the vocabulary scores of the two groups before and after the treatments were implemented. As indicated above, in the pretests before the treatment, the CG had higher scores than the EG. When the difference between the two groups was measured by a two-tailed independent-samples T test, there remained no significant difference in the vocabulary level of the two groups ($t(60)=-1.01$, $p>.05$), as was also evidenced by the TOFEL test. After the treatment, which lasted three weeks, the results of the posttests revealed that the EG did better than the CG. A two-tailed independent-samples T test confirmed that there existed a significant difference in the test results between the two groups ($t(60)=2.45$, $p<.05$). In the delayed tests, the EG had a higher retention rate than the CG. However, a two-tailed independent-samples T test ($t(60)=.47$, $p>.05$) indicated that there was no significant difference in their performance five weeks after the treatment.

Table 1: Performance of the two groups before and after treatments

	EG		CG	
Tests	Mean	SD	Mean	SD
Pretest	33.34	14.30	37.13	15.21
Posttest	88.41	12.00	79.70	15.87
Delayed Test	66.44	20.74	64.23	15.81

EG=Experimental Group; CG=Control Group

To summarize, the two groups evidenced no significant difference in terms of their level of vocabulary size before the treatment was carried out. After the treatment, there was a significant difference between the two groups in terms of their vocabulary gains, revealing that the EG had learned more effectively than the CG. However, the delayed test indicated no significant difference in vocabulary retention rates.

4. DISCUSSION

4.1 Effectiveness of vocabulary learning via mobile phone SMS

Vocabulary learning involves memorizing the sound, written form, and meaning of a word as well as having the ability to retrieve the three from memory. The quality of such retrieval, from the cognitive perspective, largely depends on the effective use of short-term and long-term memory. Short-term memory (STM), which is also called, working memory, refers to "representations that are currently being used or have recently used and last for a short duration" (Proctor & Vu, 2003, p. 43). It is characterized by its limited capacity, in which received input stays transiently and slips away unconsciously. Conversely, long-term memory (LTM) refers to "representations that can be remembered for durations longer than can be attributed to STM. LTM can involve information presented minutes ago or years ago" (p. 44).

In vocabulary learning, the ultimate goal of learners is to enable newly acquired vocabulary to be not only kept in LTM but also stored in it in terms of effective retrieval of a lexical item for active use. However, newly learned vocabulary items are usually stored in STM and very few words can be transferred into LTM directly without “multiple encounters with a lexical item, cognitive depth, affective depth, personalization, imaging, use of mnemonics and conscious attention that is necessary to remember a lexical item” (Pavičić Takač, 2008, p. 10). As Wang and Thomas (1992) found, rote learning or memorizing vocabulary through rote learning is more effective than imagery-based instruction. In order to remember vocabulary long-term, reinforcement in terms of frequent review, strong self-motivation and active associations is needed to help smooth the process (Bornstein, n.d.).

The findings of the current study echo those of the study conducted by Lu (2008), showing that short-term spaced vocabulary learning via mobile phones can be more effective than massed vocabulary learning through the paper medium. This may be due to the students’ easy access to the mobile device, which results in their repeated exposures to and frequent practice of the vocabulary items in a spaced manner on a daily basis. Such a learning approach is conducive to enhanced vocabulary learning (Byrnes & Wasik, 2009; Waring & Nation, 2004). This view has also been reported by the learners.

> Currently I had myself more exposed to the words that I had to memorize than I had done before. Everyday when I was on my way to the canteen in the mornings and to the classroom, as well as on my way back to the dormitory, I always read and memorized the words via my mobile phone. This improved frequency of exposure has led to enhanced vocabulary learning fairly naturally. (200905101745)

However, such newly learned words are only tenuously acquired. As these words are just temporarily held in working memory, they have not become part of the learners’ linguistic system. When learners do not give themselves repeated exposures to the words, they can be easily dropped from working memory. Only when they are integrated into long-term memory, can they be “firmly attached to a network of words, ideas, and concepts that the brain can access easily” (Wolfe & Nevills, 2004, p. 128). Since the words are temporarily existent in short-term memory, problems of effective retrieval of the words surface over a longer period time when the learners do not access the words regularly. That may illustrate why the delayed tests fail to show greater effectiveness of vocabulary learning with mobile phones. Some of the learners noted this problem as follows:

> The primary challenge, in my eye[s], is [whether] we could learn the words instantly and persistently. If we can keep learning words this way everyday and make it a habit, we can gain a lot. If we leave today’s words to tomorrow, all the efforts may be in vain. (200905094710)

> One of the problems [of learning with mobile phones] is that the words that have been remembered can slip away quickly. Also, I often got myself confused with some of the English words and their Chinese translations. This is really annoying for me. (200905072156)

4.2. Advantages of vocabulary learning via mobile phones

This effectiveness may be achieved due to various advantages. Firstly, learning vocabulary with a mobile phone can allow learners to take advantage of fragmented time. Chinese learners usually try to accomplish two goals in vocabulary learning. One is to recognize the words they have learned so that they are able to pass the required tests, without turning the words into part of their linguistic system. These words are usually referred to as passive words, which may not be used effectively by learners but can be recognized in terms of their meanings. The other is to recognize and use the words they have acquired. Learners are capable of using them not only in doing tests but also in their everyday communication. Generally, the words that can be recognized only are low in retention rates while those that can be both recognized and used are high. Learners are able to learn the targeted words anytime and anywhere. Such an advantage of mobile learning has been acknowledged by dozens of subjects in their written report.

> Reading words from text messages is really a time killer during meals, and it helped us make full use of fragmented time. On the other hand, it feels like a memo reminds us of learning English and studying vocabulary. For me, the former is the most significant advantage. That’s because I happen to have the habit of reading i-news on my mobile phone. And remembering words on the phone fulfills me more with my meals. (200905065932)

> I think it's helpful for learning English. It’s an effective way to learn more vocabulary. Perhaps we don’t have the habit to bring the vocabulary book with us wherever we go, but we carry a cell phone with us all the time. We can use the short spare time when we are riding the subway or in the queue….. (200905071529)

> I think it is a good way because I bring my mobile phone almost everywhere and at any time.

> Sometimes I don't have things to do, such as when traveling in the subway, I can read the vocabulary many times and to remember them. In a word, it can help me to make use of leisure time to learn vocabulary. (200905091522)

So, too, it makes vocabulary learning more convenient. Mobile phones have become a necessity for Chinese students. Over the years, they have developed a habit of reading mobile newspapers and short stories on the phone, which are delivered by SMS. Likewise, they can also learn vocabulary more conveniently. The following are the comments made by some of the students:

> The first advantage for vocabulary learning via mobile phones is convenience. The second is convenience and the third is still convenience. (200905045443)

> [There are two advantages:] Convenience: the words can [be] kept in my cell phone so that I could recite them no matter where [and when]. Recommendation: it can remind me of reciting new words. (200905091955)

> I think it is a really good method and a good idea to enlarge my vocabulary. For one reason, it is convenient. I don't need to take the heavy vocabulary book. Using this method, I can recite English words everywhere and every time. For another reason, the message can remind me in case I forget reciting when there are too many things need to deal with. (200905091955)

Moreover, it enables learners to acquire vocabulary in a motivated manner. When vocabulary messages are received by the learners during lunch and dinner times regularly, they are reminded to give their attention to the words they are expected to work on. To some extent, message ring tones during this period of time became a reminder for them to concentrate on daily vocabulary tasks. This could give rise to a stimulating effect, which can result in helping them to form the habit of self-regulated learning.

> It is useful and efficient. Yes, it is a good way because in this way we can learn vocabulary regularly and effectively. It urges us to learn English persistently. (200904306697)
> I think it's a good way as the messages everyday will remind me that I need to memorize some words. You see, I always forget to do that if no one reminds me to do that. (200904274802)

> This way of learning makes me spend more time on memorizing words. Besides, it can also help me to learn autonomously in the sense that I can make good use of the fragmented time to learn the words that I need in addition to what I have been expected to learn by the professor. (200905087259)

Furthermore, it becomes more efficient for a learner to memorize target words within a given period. As the students are exposed to the regular limited number of words each day, a huge learning task has been divided into multiple mini-tasks, which makes it psychologically less overwhelming to deal with learning tasks. One of the students made the following comment:

> Increasing one's vocabulary is a long-term and challenging task to accomplish. However, when the vocabulary words are broken down into everyday mini-tasks, it is easy for me to deal with. (200905034832)

4.3. Disadvantages of vocabulary learning with mobile phones

Although advantages of learning with mobile phones are apparent, there are also some disadvantages, which are embedded in the nature of the modern technology First, unlike computer RAM, mobile phone memory is normally not large enough to store all the words received. Information storage for a learner becomes problematic, especially when vocabulary items are received beyond what can be stored in a phone's memory. When this problem arises, learners tend to delete some messages or some vocabulary items to save more space for incoming messages, including vocabulary messages. Even worse, dysfunction can occur when messages are stored beyond the memory capacity of the device. For some learners, phonetic symbols cannot be properly displayed on their phones. Learners with such phones have a negative experience with this type of learning, which affects their learning efficiency. Finally, long messages are delivered as segmented shorter ones. As with most mobile phone systems, there is a word limit in messages delivered by the Fetion messaging service. When words in a message exceed the limit, the system automatically segments the message into two or more separate mini-messages. Such mini-messages are not necessarily received in the correct sequence, which is both confusing and annoying. The following is one of the comments from the students' written reports:

> Sometimes, a long message has been cut into multiple messages, which are sent separately but received not in the order of times. They look very messy. (200905045443)

From a pedagogical perspective, there are also a few weaknesses. First, messaging could be a source of annoyance and distraction. Students may feel distracted or disturbed when they are concentrating on their school work or other things that are unrelated to vocabulary learning. Unless a proper schedule has been set up with them and it has been closely followed, learning with mobile phones, especially via SMS, can be annoying, with messages coming from all sources, including friends' messages and others. A few students made such a comment:

> I think learning vocabulary through instant messaging via the mobile phone is a new method. It's convenient and efficient. It encourages me to make full use of time. However, as I can get dozens of messages each day, including notices from my volunteer's union and the monitor of my class, as well as newspaper from the China Mobile and so on, sometimes I would be fed up with the instant messages. (200905107561)

Second, reviewing a particular learned word can be troublesome. It can be quite time consuming to locate previous messages, especially for students who receive dozens every day. In contrast, such a problem does not exist in learning with the paper medium. Some of the students make the following comment:

> It's not convenient to find out the vocabulary messages among tens and tens of short messages. Besides, there [is] always something wrong with the words shown on the phone. (200905107561)
>
> When messages are large in number, it is difficult to review the words in early messages. (200905071765)

Third, words learned solely with a mobile phone cannot be remembered long. Successful learning with mobile phones involves multiple learning strategies. When students embark on vocabulary learning with a mobile phone, some of them choose to rely on the medium only while others resort to other media for assistance. When students adopt the first method, they tend to memorize words by interacting with the screen, which involves merely superficial cognitive processing. Such mnemonic strategies end up failing to transfer learned words into long-term memory because effective vocabulary learning involves not only multiple encounters with a lexical item but also active retrieval (Pavičić Takač, 2008).

When students take the second learning approach, they tend to use mobile phones as a supplementary tool for vocabulary learning. In other words, they do not rely on the tool but seek to use other resources for the facilitation of their learning. One of the most frequently used methods is copying the easy-to-forget words on a sheet of paper. When they have sufficient time, they read, write, and use the target words. When they don't have much time, they tend to repeat what the students do in the first method.

> Whenever I received the words, I copied them on a small book. Then, I memorized them with different methods. In this way, I could keep all those words in the book. When there was no space left in the book, I could delete those I had known. For me, this combined way of learning was most effective. (200905051898)
>
> In my opinion, I think reading words on the [screen] is far from enough. I personally vote for writing down the words on a dedicated notebook which [could] keep record of all the words I have received. What's more, it's a good way to go over the vocabulary I've learned before. (200905065932)
>
> I copied the words in the messages in a book. After I read a word, I wrote it a few times. This could help strengthen my memory of the word. (200905072156)

4.4. Implications for pedagogical practices

Vocabulary learning with mobile phones is a novel way of transforming language learning with technology. It allows learners to take advantage of emerging technologies to enhance their learning efficiency. However, owing to the constraints of the technology, several issues need to be considered in relation to the pedagogical use of such a technology. First, mobile phones can only be used as a complement of traditional vocabulary learning such as use of vocabulary books and dictionaries, as well as context-based vocabulary learning. There is no denying that learning with mobile phones can bring convenience and that such a technology can allow learning to take place anywhere and anytime. Nevertheless, the innate weaknesses of SMS technology reduce the possibilities of its effective application in learning, especially in terms of lack of multiple ways of interaction between a learner and the technology.

Second, delivery schedules should be worked out together with students. As students have different learning schedules and habits, unexpected messaging could be disturbing and distracting, which may also be discouraging instead of motivating in learning.

Third, there may be a conflict between teachers' work schedules and vocabulary delivery schedules. This can be problematic especially when students prefer to have a delivery schedule that conflicts with teachers' teaching schedule. Before this instructional method is adopted, teachers need to plan ahead to avoid such troublesome conflicts or think of other technologies that could support timed message delivery.

Fourth, intended messages may not be received by students. The success of instant vocabulary delivery is crucially important for learners because they expect it to happen and are psychologically ready for the messages. However, the quality of message delivery depends on numerous factors. What's more, no message delivery technology is perfect and no technology is always reliable in general. Intended messages may eventually end up missing in the delivery process. This requires that teachers inform their students of such unexpected happenings and make them responsive to them. Nevertheless, countermeasures should be taken well in advance.

Finally, a blended approach to vocabulary learning may be more effective. As is revealed from this study, short messaging technology can effectively facilitate vocabulary learning on the strength of the technology's advantages, especially when students are able to be more frequently exposed to target vocabulary words in intentional learning. However, the disadvantages of the technology have minimized the long-term effects, resulting in no significant difference between the two learning approaches. Students' reports have demonstrated that both approaches have their innate advantages and disadvantages. When a blend of the two approaches is adopted, the novel approach may complement traditional approaches to offset their respective weakness. However, before this proposed blended approach can be realized, the question of how the effectiveness of each can be augmented needs to be addressed. This is a subject for further testing and research.

5. CONCLUSIONS

This study has made several findings. First, students can learn vocabulary more effectively short-term via mobile phones than with paper material, but the effectiveness can be only achieved through repeated exposures, which is also supported by Lu's (2008) findings. When exposures become less frequent, retention rates decline to such an extent that there is no significant difference identified between the two approaches. Second, both learning approaches have their own advantages and disadvantages. A blended approach to vocabulary learning may help increase the effectiveness from the perspective of sustained retention rates. Third, even though mobile phone technology can play a crucially important role in vocabulary learning, effective learning may occur only when the weakness of the technology is counterbalanced by taking a blended learning approach.

In anchoring the findings of this study to the larger research literature, some of its limitations must be acknowledged, which may offer opportunities for further research. First, this study employs a quasi-experimental mixed approach and so inevitably involves uncontrolled environmental variables which could influence the findings. Second, the subjects were all from a non-Western educational background and largely limited to students of arts. Whether the same results would be obtained with students from other backgrounds majoring in other disciplines remains to be determined. Third, the fact that the experimental group had a fixed exposure schedule to the new vocabulary, whereas the control group did not, may have had as much influence on the outcome as the use of SMS itself. In order to unequivocally establish the influence of mobile phone technology on vocabulary learning, any future studies will need to better identify and control the frequency and duration of students' exposure to target vocabulary. Lastly, as they may impact upon learning effectiveness, effective methods and tools for relevant data collection need to be developed and their effects on learning performance also require further attention.

REFERENCES

Alanen, R. (1995). Input enhancement and rule presentation in second language acquisition. In R. Scmidt (Ed.), *Attention and awareness in foreign language learning and teaching* (pp.259-302). Honolulu, HI: University of Hawaii Press.

Al-Seghayer, K. (2001). The effect of multimedia annotation modes on l2 vocabulary acquisition: A comparative study. *Language Learning & Technology, 5*(1), 202-232.

Barcroft, J. (2009). Strategies and performance in intentional L2 vocabulary learning. *Language Awareness, 18*(1), 74-89.

Başoğlu, E. B., & Akdemir, Ö. (2010). A comparison of undergraduate students' English vocabulary learning: using mobile phones and flash cards. *The Turkish Online Journal of Educational Technology, 9*(3), 1-7.

Bloom, K. C., & Shuell, T. J. (1981). Effects of massed and distributed practice on the learning and retention of second-language vocabulary, *Journal of Educational Research, 74*(4), 245-248.

Bornstein, A. (n.d.). Memorizing vocabulary and languages. VideoJug, Retrieved June 11, 2010, from http://www.videojug.com/interview/memorizing-vocabulary-and-languages

Byrnes, J. P., & Wasik, B. A. (2009). *Language and literacy development: what educators need to know*. New York, NY: The Guildford Press.

Carter, R. (1987) Vocabulary and second/foreign language teaching. *Language Teaching 20*(1), 3-16.

Cavus, C., & Ibrahim, D. (2009). m-Learning: An experiment in using SMS to support learning new English language words. *British Journal of Educational Technology, 40*(1), 78-91.
Channell, J. (1988). Psycholinguistic considerations in the study of L2 vocabulary acquisition. In R. Carter & M. McCarthy (Eds.), *Vocabulary and language teaching* (pp. 83-96). New York: Longman.
Chen, Z. (2006). *The effects of multimedia annotations on L2 vocabulary immediate recall and reading comprehension: A comparative study of text-picture and audio-picture annotations under incidental and intentional learning conditions* (Doctoral dissertation, University of South Florida, 2006). DAI-A, 68/01, 170.
Chun, D. & Plass, J. (1996). Effects of multimedia annotations on vocabulary acquisition. The *Modern Language Journal, 80*(2), 183-198.
Coady, J. (1997). L2 vocabulary acquisition through extensive reading. In J. Coady & T. Huckin (Eds.), *Second language vocabulary acquisition* (pp. 225–237). Cambridge: Cambridge University Press.
Cobb, T. (1999). Breadth and depth of vocabulary acquisition with hands-on concordancing. *Computer Assisted Language Learning 12*, 345 - 360.
Cohen, A. D. (1987). The use of verbal and imagery mnemonics in second-language vocabulary learning. *Studies in Second Language Acquisition, 9*(1), 43-62.
Crow, J. T. (1986). Receptive Vocabulary Acquisition for Reading Comprehension. *The Modern Language Journal, 70*(3), 242-250.
Estes, W. K., & DaPolito, F. (1967). Independent variation of information storage and retrieval processes in paired-associate learning. *Journal of Experimental Psychology, 75*(1), 18-26.
Fraser, C. A. (1999). Lexical processing strategy use and vocabulary learning through reading. *Studies in Second Language Acquisition, 21*(2), 225–241.
Gass, S. M. (1988). Second language vocabulary acquisition. *Annual Review of Applied Linguistics, 9*, 92-106.
Gass, S. M., & Selinker, L. (2001). *Second language acquisition: An introductory course*. Mahwah, NJ: Lawrence Erlbaum Associates.
Grace, C. (1998). Personality type, tolerance of ambiguity, and vocabulary retention in CALL. *CALICO Journal, 15*(1-3), 13-46.
Groot, P. J. M. (2000). Computer assisted second language vocabulary acquisition. *Language Learning & Technology, 4*(1), 60-81.
Gui, S. (2006). A holistic view of English vocabulary learning in China. *Foreign Language World,* (1), 57-65.
Harmer, J. (1994). *The practice of English language teaching*. London: Longman.
Harmon, J. M., Hedrick, W. B. (2005). Research on vocabulary instruction in the content areas: implications for struggling readers. *Reading & Writing Quarterly, 21*(3), 261–280.
Holley, F. M. (1973). A study of vocabulary learning in context: The effect of new-word density in German reading materials. *Foreign Language Annals, 6*(3), 339-347.
Horst, M., Cobb, T., & Meara, P. (1998). Beyond a clockwork orange: Acquiring second language vocabulary through reading. *Reading in a Foreign Language, 11*, 207-223.
Horst, M., Cobb, T., & Nicolae, I. (2005). Expanding academic vocabulary with an interactive on-line database. *Language Learning & Technology, 9*(2), 90-110.
Hulstijin, J. H. (1992). Retention of inferred and given word meanings: Experiments in incidental vocabulary learning. In P. J. Arnaud & H. Béjoint (Eds.), *Vocabulary and Applied Linguistics* (pp. 113-125). London: Macmillan.
Hulstijn, J. H. (2000). The use of computer technology in experimental studies of second language acquisition: a survey of some techniques and some ongoing studies. *Language Learning & Technology, 3*(2), 32-43.
Hulstijn, J. H., Hollander, M., & Greidanus, T. (1996). Incidental vocabulary learning by advanced foreign language students: The influence of marginal glosses, dictionary use, and reoccurrence of unknown words. *The Modern Language Journal, 80*(3), 327-339.
Jenkins, J. R., Stein, M. L., & K. Wysocki. (1984). Learning vocabulary through reading. *American Educational Research Journal, 21*(4), 767-787.
Jones, L. C. (2003). Supporting listening comprehension and vocabulary acquisition with multimedia annotations: The students' voice. *CALICO Journal, 21*(1), 41-65.
Jones, L. C. (2006). Effects of collaboration and multimedia annotations on vocabulary learning and listening comprehension. *CALICO Journal, 24*(1), 33-58.
Jones, L. C., & Plass, J. L. (2003). Supporting listening comprehension and vocabulary acquisition in French with multimedia annotations. *The Modern Language Journal, 86*(iv), 546-561.
Judd, E. L. (1978). Vocabulary teaching and TESOL: A need for reevaluation of existing assumptions. *TESOL Quarterly, 12*(1), 71-76.
Kasper, L. F. (1993), The keyword method and foreign language vocabulary learning: A rationale for its use. *Foreign Language Annals, 26*(2), 244-251.
Kempe, V., Brooks, P. J., & Christman, S. D. (2009). Inconsistent handedness is linked to more successful foreign language vocabulary learning. *Psychonomic Bulletin & Review, 16*(3), 480-485.
Kojic-Sabo, I. & Lightbown, P. M. (1999). Students' approaches to vocabulary learning and their relationship to success. *The Modern Language Journal, 83*(2), 176-192.
Kennedy, C., & Levy, M. (2008). L'italiano al telefonino: Using SMS to support beginners' language learning. *The*

ReCALL Journal, 20(3), 315-330.
Koren, S. (1999). Vocabulary instruction through hypertext: Are there advantages over conventional methods of teaching? *TESL-EJ, 4*(1), A-2, 1-18. Retrieved October 1, 2009, from http://tesl-ej.org/ej13/a2.html
Kormos, J. (2006). *Speech production and second language acquisition*. Mahwah, NJ: Lawrence Erlbaum.
Krashen, S. (1989). We acquire vocabulary and spelling by reading: Additional evidence for the input hypothesis. *The modern language journal. 73*(4). 440-464.
Laufer, B. & Girsai, N. (2008). Form-focused Instruction in Second Language Vocabulary Learning: A Case for Contrastive Analysis and Translation. *Applied Linguistics, 29*(4), 694–716.
Laufer, B. (2009). Second language vocabulary acquisition from language input and from form-focused activities. *Language Teaching, 42*(3), 341–354.
Laufer, B. & Hulstijn, J. (2001). Incidental vocabulary acquisition in a second language: the effect of task induced involvement load. *Applied Linguistics, 22* (1), 1-26.
Levy, M., & Kennedy, C. (2005). Learning Italian via mobile SMS. In A. Kukulska-Hulme & J. Traxler (Eds.), *Mobile learning: A handbook for educators and trainers* (pp. 76-83). Oxon, UK: Routledge.
Li, C. (2009). *SMS-based vocabulary learning for ESL students*. Unpublished master thesis, Auckland University of Technology, New Zealand.
Loucky, J. P. (2003). Using computerized bilingual dictionaries to help maximize English vocabulary learning at Japanese colleges. *CALICO Journal, 21*(1), 105-129.
Lu, M. (2008). Effectiveness of vocabulary learning via mobile phone. *Journal of Computer Assisted Learning, 24*(6), 515-525.
Luk, R. W. P., & Ng, A. B. Y. (1998). Computer-assisted learning of Chinese idioms. *Journal of Computer Assisted Learning, 14*(1), 2-18.
Mcconatha, D., Praul, M., & Lynch, M. J. (2008). Mobile learning in higher education: an empirical assessment of a new educational tool. *The Turkish Online Journal of Educational Technology, 7*(3), 15-21.
Min, H.-T. (2008). EFL vocabulary acquisition and retention: reading plus vocabulary enhancement activities and narrow reading. *Language Learning, 58*(1), 73-115.
Mondria, J.-A., & Wit-de Boer, M. (1991). The effects of contextual richness on the guessability and the retention of words in a foreign language. *Applied Linguistics, 12*(3), 249-267.
Nagy, W. (1997). On the role of context in first- and second-language vocabulary learning. In N. Schmitt & M. McCarthy (Eds.), *Vocabulary: Description, acquisition and pedagogy* (pp. 64-83). Cambridge: Cambridge University Press.
Nakata, T. (2008). English vocabulary learning with word lists, word cards and computers: implications from cognitive psychology research for optimal spaced learning. *ReCALL, 20*(1), 3-20.
Nation, P. (1990). Teaching and learning vocabulary. Boston: Heinle & Heinle.
Nation, I.S.P. (Ed.) (2001). *Learning vocabulary in another language*. Cambridge: Cambridge University Press.
Okuyama, Y. (2007). CALL Vocabulary learning in Japanese: Does Romaji help beginners learn more words? *CALICO Journal, 24*(2), 355-379.
Papagno, C. (1991). Phonological short-term memory and foreign-language vocabulary learning. *Journal of Memory and Language, 30*(3), 331-347.
Parry, K. (1991). Building a vocabulary through academic reading. *TESOL Quarterly, 25*(4), 629-653.
Pavičić Takač, V. (2008). *Vocabulary learning strategies and foreign language acquisition*. Clevedon, UK: Multilingual Matters.
Prince, P. (1996). Second language vocabulary learning: The role of context versus translations as a function of proficiency. *The Modern Language Journal, 80*(4), 478-493.
Proctor, P. W., & Vu, K.-P. L. (2003). Human information processing: An overview for human-computer interaction. In J. A. Jacko, & A. Sears (Eds.), *The human-computer interaction handbook: fundamentals, evolving technologies, and emerging technologies* (pp. 35-51). Mahwah, NJ: Lawrence Erlbaum Associates.
Read, J. (2004). Research in teaching vocabulary. *Annual Review of Applied Linguistics, 24*, 146-161.
Robinson, P. (2001). *Cognition and second language instruction*. Cambridge, UK: Cambridge University Press.
Schmidt, R. (2001). Attention. In P. Robinson (Ed.), *Cognition and second language instruction* (pp. 3-32). Cambridge, UK: Cambridge University Press.
Schmidt, R. W. (1990). The role of consciousness in second language learning. *Applied Linguistics, 11,* 129-158.
Singleton, D. (1997). Learning and processing L2 vocabulary. Language Teaching, 30, 213-225.
Sonbul, S., & Schmitt, N. (2009). Direct teaching of vocabulary after reading: is it worth the effort? *ELT Journal*, 1-8.
Song, Y. (2008). SMS enhanced vocabulary learning for mobile audiences. *International Journal of Mobile Learning and Organisation, 2*(1), 81-98.
Stockwell, G. (2007). Vocabulary on the Move: Investigating an intelligent mobile phone-based vocabulary tutor. *Computer Assisted Language Learning, 20*(4), 365-383.
Stockwell, G. (2010). Using mobile phones for vocabulary activities: Examining the effect of the platform. *Language Learning & Technology, 14*(2), 95-110.
Svenconis, D. J., & Kerst, S. (1994). Investigating the teaching of second-language vocabulary through semantic mapping in a hypertext environment. *CALICO Journal, 12*(2 & 3), 33-57.

Thornton, P., & Houser, C. (2001). Learning on the Move: Vocabulary Study via Email and Mobile Phone SMS. In C. Montgomerie & J. Viteli (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2001* (pp. 1896-1897). Chesapeake, VA: AACE.

Thornton, P., & Houser, C. (2005). Using mobile phones in English education in Japan. *Journal of Computer Assisted Learning 21*(3), 217-228.

Tinkham, T. (1997). The effects of semantic and thematic clustering on the learning of second language vocabulary. *Second Language Research, 13*(2), 138–163.

Tseng, W.-T., & Schmitt, N. (2008). Toward a model of motivated vocabulary learning: A structural equation modeling approach. *Language Learning, 58*(2), 357-400.

Tseng, W.-T., Dörnyei, Z., & Schmitt, N. (2006). A new approach to assessing strategic learning: The case of self-regulation in vocabulary acquisition. *Applied Linguistics, 27*(1), 78–102, doi:10.1093/applin/ami046.

Tsoua, W., Wang, W., & Li, H. (2002). How computers facilitate English foreign language learners acquire English abstract words. *Computers & Education, 39*(4), 415-428.

Wang, A. Y, & Thomas, M. H. (1992). The effect of imagery-based mnemonics on the long-term retention of Chinese characters. *Language Learning, 42*(3), 359-376.

Waring, B., & Nation, P. (2004). Second language reading and incidental vocabulary learning. *Angles on the English-Speaking World, 4*, 11-23.

Webb, S. (2007). Learning word pairs and glossed sentences: the effects of a single context on vocabulary knowledge. *Language Teaching Research 11*(1), 63–81.

Webb, S. (2008). Receptive and productive vocabulary sizes of l2 learners. *Studies in Second Language Acquisition*, *30*(1), 79–95.

Wilkins, D. A. (1972). *Linguistics in language teaching*. London: Edward Arnold.

Wolfe, P., & Nevills, P. (2004). Building the reading brain, preK-3. Thousand Oaks, CA: Corwin Press.

Yeh, Y. L., & Wang, C.-W. (2003). Effects of multimedia vocabulary annotations and learning styles on vocabulary learning. *CALICO Journal, 21*(1), 131-144.

Yoshii, M., & Flaitz, J. (2002). Second Language Incidental Vocabulary Retention: The Effect of Text and Picture Annotation Types. *CALICO Journal, 20*(1), 33-58.

Zhang, H. S., & Song, W. (2009). A study of Chinese learners' behaviors in self-regulated CALL environments. In W. Li & J. Zhou (Eds.), *Proceedings of the 2nd IEEE International Conference on Computer Science and Information Technology* (pp. 4-8), Vol. 5. Piscataway, NJ: IEEE Press.

Zhao, Y. (2007). *A Comparative Study of Intentional and Incidental Vocabulary Learning for Chinese Non-English Majors*. Unpublished master's thesis, Nanjing Normal University, Nanjing, Jiangsu Province, China.

SELF-COMPASSION AND INTERNET ADDICTION

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ABSTRACT
The purpose of this research is to examine the relationship of self-compassion and internet addiction. Participants were 261 university students who completed a questionnaire package that included the Self-compassion Scale and the Online Cognition Scale. The hypothesis model was tested through structural equation modeling. In correlation analysis, self-kindness, common humanity, and mindfulness factors of self-compassion were found negatively related to internet addiction. On the other hand, self-judgment, isolation, and over-identification factors of self-compassion were found positively correlated to internet addiction. According to path analysis results, internet addiction was predicted negatively by self-kindness and mindfulness. Further self-judgment, isolation, and over-identification predicted internet addiction in a positive way. Results were discussed in the light of literature.
Keywords: Media in education; Human-computer interface; Higher education

1. INTRODUCTION

Self-compassion means being discerning and gentle towards oneself in the face of hardship or perceived inadequacy. It also involves acknowledging that suffering, failure, and inadequacies are part of the human condition, and that all people—oneself included—are worthy of compassion (Neff, 2003b; Neff, Kirkpatrick, & Rude, 2007). Neff (2003a, b) has proposed that self-compassion includes three main components: Self-kindness versus self-judgment, a sense of common humanity versus isolation, and mindfulness versus over-identification. While these three components of self-compassion are conceptually distinct and are experienced differently at the phenomenological level, they interact so as to mutually enhance and engender one another (Neff, 2003a).

The first dimension, self-kindness, contains being kind and understanding toward oneself in instances of pain or failure rather than being harshly self-critical. When noticing some disliked aspect of one's personality, for example, the flaw is treated gently and the emotional tone of language used towards the self is soft and supportive (Neff, 2009). Self-compassion entails not being self-critical when one's expectations are not met and not being harmful to individual's ego in order to make achievements. Instead, self-compassion suggests the individual should encourage his/her ego gently and patiently to change behaviors (Neff, 2003a). Common humanity, the second dimension of self-compassion, is seeing one's happy or painful experiences as not personal, but as all human beings'. The sense of common humanity principal to self-compassion involves recognizing that all humans are imperfect and that they fail and make mistakes (Neff, 2009). Having this kind of awareness, one perceives these experiences as part of the larger human experience rather than feeling isolated and alienated from the society (Neff, 2003a). This awareness also emphasizes one's relatedness to all other humans and to another individual (Kirkpatrick, 2005).

Mindfulness, the third component of self-compassion, is a pre-conceptual awareness that allows individual to accept life's most stressful and painful emotions without being carried away by them (Gunaratana, 1993; Martin, 1997; Neff, 2003a; Nisker, 1998; Rosenberg, 1999). Mindfulness is a state of balanced awareness that one's feelings and thoughts are observed without avoiding or trying to change them, without exaggeration and prejudice. When individuals accept and tolerate their distress and pain and when they are gentle and kind toward themselves they avoid suppressing their emotions and thoughts. Thus, when they are aware that distress and pain are something all humans experience, they are not trapped by over-identification. Therefore, self-compassion functions as an adaptive strategy for emotion-organizing through decreasing negative emotions but creating more positive emotions of kindness and relatedness (Neff, Hsieh, & Dejitterat, 2005).

Although new, the construct of self-compassion shows great promise and demonstrates positive associations with current markers of psychological well-being. Studies have demonstrated that self-compassion is negatively associated with self-criticism, depression, anxiety, rumination, thought suppression (Neff, 2003a), performance-approach/avoidance goals (Akın, 2008a), submissive behavior (Akın, 2009) and positively with social relationship, emotional intelligence, self-determination (Neff, 2003a), learning-approach goals (Akın, 2008a), psychological well-being (Akın, 2008b), control beliefs for learning (Iskender, 2009), self-efficacy (Iskender, 2009), and academic success (Conway, 2007). Also, self-compassion has been shown to be positively related to social identity strength and unrelated to race-based rejection sensitivity (Williams, 2005).

1.1. Internet addiction

The Internet, together with its merits and defects, is widely questioned (Kilimci, 2010) and selecting the 'right' or 'good quality' information has become an issue (Özad & Kutoğlu, 2010). Internet addiction, as a form of technological addiction (Griffiths, 2001) ruins lives by causing neurological complications, psychological disturbances, and relational chaos (Hur, 2006). This phenomenon affects people with varying frequency around the world and has produced negative impacts on the academic, relationship, financial, and occupational aspects of many lives (Chou & Hsiao, 2000; Griffiths, 2000; Young, 1998). As a result, the importance of research on internet addiction has grown (Bayraktar & Gun, 2007; Huang, Wang, Qian, Zhong, & Tao, 2007) and researchers have described a wide range symptoms of internet addiction such as intense preoccupation with using the internet (Chou, 2001), excessive amounts of time spent online, compulsive use of the internet, difficulty in managing the time spent on the internet, feeling that the world outside of the internet is boring, becoming irritated if disturbed while online, and decreased social interaction with ''real'' people (Kraut et al., 1998). They have also characterized internet addiction by psychomotor agitation, anxiety, craving (Ferraro, Caci, D'Amico, & Di Blasi, 2007), hostility (Yen, Ko, Yen, Wu, & Yang, 2007), substance experience (Ko et al., 2006; Yen, Yen, Chen, Chen, & Ko, 2007), loss of control, intolerance, withdrawal, impairment of function, reduced decision-making ability (Ko, Yen, Chen, Chen, & Yen, 2005), and constant online surfing despite negative effects on social and psychological welfare. Correspondingly, research on internet addiction demonstrated that the greater use of the internet is associated positively with some social and psychological variables such as, declines in the size of social circle, depression (Yen, Ko et al., 2007; Young & Rogers, 1998), loneliness (Kraut et al., 1998; Nalwa & Anand, 2003; Whang, Lee, & Chang, 2003), lower self-esteem and life satisfaction (Ko et al., 2005), sensation seeking (Lin & Tsai, 2002), poor mental health (Yang, 2001; Young & Rogers, 1998), external academic locus of control (İskender & Akin, 2010), parent-adolescent conflict (Yen, Yen et al., 2007), and low family function (Armstrong, Phillips, & Saling, 2000; Ko et al., 2005; Yen, Yen et al., 2007) and negatively with internal academic locus of control and social self-efficacy (İskender & Akin, 2010).

1.2. The present study

Because self-compassion research is still developing, studies examining the relationship between self-compassion and some psychological variables such as internet addiction are needed. Thus, the aim of the present study is to examine the relationships between self-compassion and internet addiction. In this study we utilized internet addiction as an indicator of psychological maladjustment and self-compassion as an indicator of psychological adjustment. Based on the relationships of internet addiction (e.g. Ferraro et al., 2007; İskender & Akin, 2010; Ko et al., 2005; Kraut et al., 1998; Nalwa & Anand, 2003; Yang, 2001; Young & Rogers, 1998) and self-compassion (Akın, 2008a; Akın, 2009; Conway, 2007; Iskender, 2009; Neff, 2003a, b; Williams, 2005) with psychological constructs we hypothesized that internet addiction would be associated negatively with self-kindness, common humanity, and mindfulness. We also hypothesized that self-judgment, isolation, and over-identification would be related positively to internet addiction.

2. METHOD

2.1. Participants

Participants were 261 university students enrolled in various undergraduate programs at the Sakarya University, Turkey. Of the participants, 75 were first-year students, 53 were second-year students, 52 were third-year students, and 81 were fourth-year students. One hundred and twenty one of the participants (46%) were males and 140 (54%) were females. A large majority of the students (88%) were between 17 and 24 years of age (20.93 ± 1.24).

2.2. Measures

Self-compassion Scale. Self-compassion was measured by using Turkish version of the Self-compassion Scale (Akın, Akın, & Abacı, 2007; Neff, 2003b). This scale is a 26-item self-report measurement consisting of six sub-scales which measure self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification. Each item was rated on a 5-point Likert scale (1=strongly disagree to 5=strongly agree). Language validity findings indicated that correlations between Turkish and English forms were .94, .94, .87, .89, .92, and .94 for six subscales, respectively. Results of confirmatory factor analysis indicated that the model was well-fit and Chi-Square value (x^2= 779.01, N= 633, sd= 264, p= 0.00) which was calculated for the adaptation of the model was found to be significant. The goodness of fit index values of the model were RMSEA= .056, NFI= .95, CFI= .97, IFI= .97, RFI= .94, GFI= .91, and SRMR= .059. The internal consistency coefficients were .77, .72, .72, .80, .74, and .74 and the test-retest reliability coefficients were .69, .59, .66, .60 .69, and .56, for six subscales, respectively.

Online Cognition Scale. Internet addiction was measured using Turkish version of the Online Cognition Scale (OCS, Davis, Flett, & Besser, 2002; Ozcan & Buzlu, 2005). This scale contains 36 items on a 7-point Likert-type scale (1=strongly disagree to 7=strongly agree). It has four sub-dimensions: Diminished impulse control (10 items), loneliness/depression (6 items), social comfort (13 items), and distraction (7 items). A sum of all scores yields a total score that ranges from 36 to 252; higher scores indicate higher internet addiction level. The Cronbach alpha internal consistency coefficients of the adapted Turkish form were .79 for diminished impulse control, .60 for loneliness/depression, .84 for social comfort, .73 for distraction, and .91 for entire scale. For test-retest reliability the scale was administered to 148 undergraduate students twice in four weeks. The Pearson correlation coefficients were .89, .76, .87, .85, and .90, respectively (Ozcan & Buzlu, 2005).

2.3. Procedure
Permission for participation of students was obtained from related chief departments and students voluntarily participated in research. Completion of the questionnaires was anonymous and there was a guarantee of confidentiality. The instruments were administered to the students in groups in the classrooms. The measures were counterbalanced in administration. Prior to administration of measures, all participants were told about purposes of the study.

2.4. Statistical Analysis
In this research, Pearson correlation coefficient and structural equation modeling was utilized to determine the relationships between internet addiction and self-compassion. The variables which were entered in structural equation modeling were measured by summing the items of each scale. These analyses were carried out via LISREL 8.54 (Joreskog & Sorbom, 1996) and SPSS 13.0.

3. RESULTS
3.1. Descriptive Data and Inter-correlations
Table 1 shows the means, standard deviations, inter-correlations, and internal consistency coefficients of the variables used.

Table 1: *Descriptive Statistics, Alphas, and Inter-correlations of the Variables*

Variables	1	2	3	4	5	6	7
1. Self-kindness	1						
2. Self-judgment	-.29**	1					
3. Common humanity	.66**	-.26**	1				
4. Isolation	-.00	.51**	.00	1			
5. Mindfulness	.66**	-.32**	.60**	-.20**	1		
6. Over-identification	-.31**	.67**	-.32**	.54**	-.35**	1	
7. Internet addiction	-.41**	.67**	-.30**	.42**	-.36**	.50**	1
Mean	14,70	13,18	11,61	11,42	12,20	11,29	81,70
Standard deviation	4,46	4,54	3,27	3,51	3,49	3,76	43,52
Alpha	.69	.68	.53	.61	.69	.67	.95

$^{**}p < .01$

When Table 1 is examined, it is seen that there are correlations between self-compassion and internet addiction. Self-kindness (r=–.41), common humanity (r=–.30), and mindfulness (r=–.36) related negatively to internet addiction. In contrary, self-judgment (r=.67), isolation (r=.42), and over-identification (r=.50) were found positively associated with internet addiction. There were also significant correlations between dimensions of self-compassion.

3.2. Structural Equation Modeling
Hypothesized model was examined via structural equation modeling (SEM). Figure 1 presents the results of SEM analysis, using maximum likelihood estimations. The model fitted well ($\chi 2$ =.06, p =.32621, GFI =.99, AGFI =.96, CFI =1.00, NFI =.99, RFI =.98, IFI =1.00, SRMR =.018, and RMSEA =.025) and also accounted for 72% of the internet addiction variances.

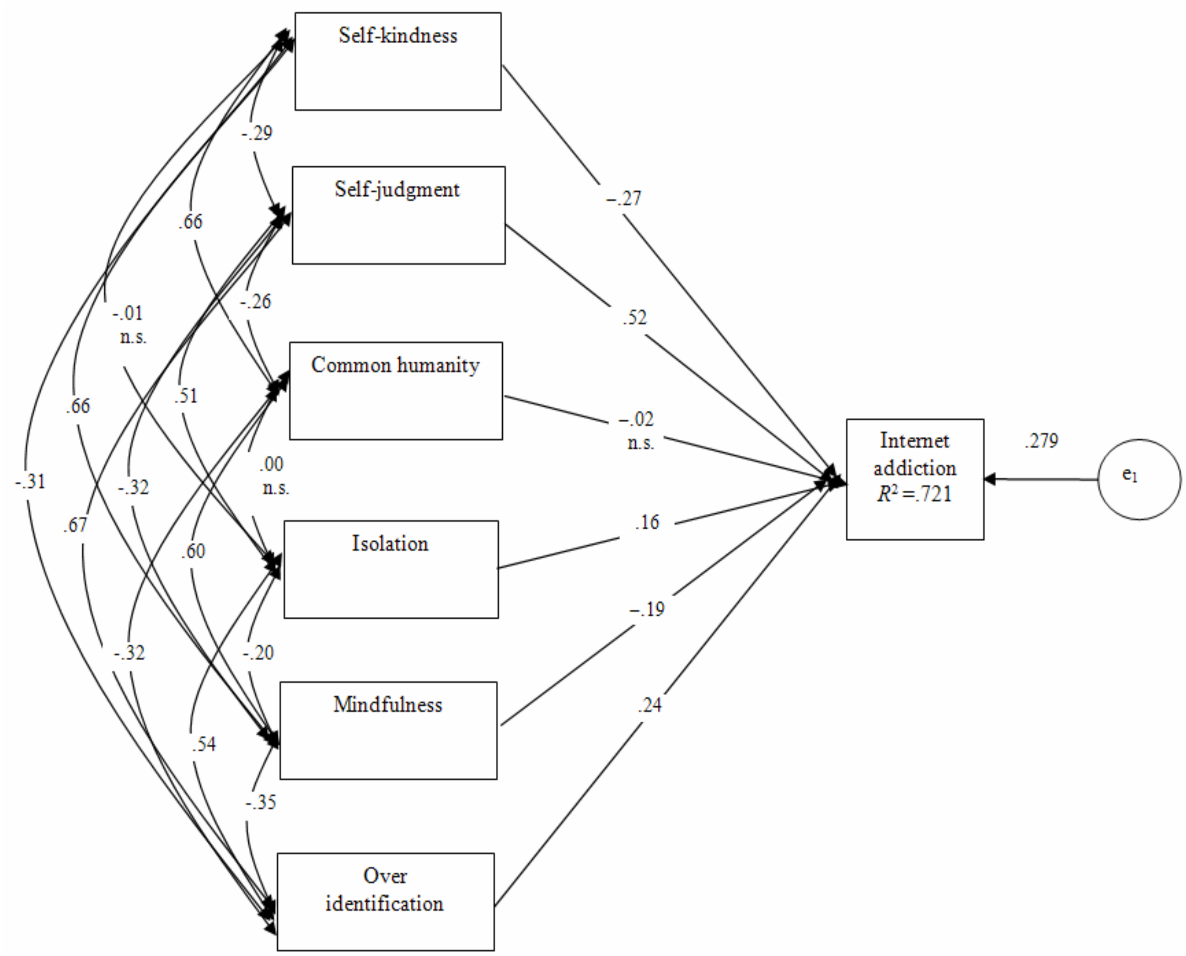

Figure 1: Path analysis between self-compassion and internet addiction

The standardized coefficients in Figure 1 clearly showed that internet addiction was predicted negatively by self-kindness (-.27) and mindfulness (-.19). On the other hand, self-judgment, isolation, and over-identification predicted internet addiction in a positive way (.52, .16, and .24, respectively). However, the path from common humanity to internet addiction wasn't significant.

4. DISCUSSION

The purpose of this research was to examine the associations between self-compassion and internet addiction. Findings have demonstrated that there are relationships between these variables. Also the goodness of fit indexes of the path model indicated that the model was acceptable (Hu & Bentler, 1999).

As predicted, the path model delineated that self-kindness and mindfulness, predicted internet addiction in a negative way. These dimensions of self-compassion are adaptive in nature and they represent that, in the event of negative life-experiences, individual's approach toward himself is warm, gentle, and kind. Also, self-compassion is a strong negative predictor of anxiety and depression even after controlling for self-criticism (Neff, 2003a), suggesting that self-compassion provides unique buffering effects (Neff, 2009). Moreover, self-kindness and mindfulness dimensions has been associated positively with well-being indices such as feelings of autonomy and competence (Neff, 2003a), happiness, optimism, positive affect (Neff, Rude, & Kirkpatrick, 2007), psychological well-being (Akın, 2008b), control beliefs for learning (Iskender, 2009), self-efficacy (Iskender, 2009), and learning-approach goals (Akın, 2008a). On the other hand, research showed that internet addiction was associated with several maladaptive variables such as depression (Yen, Ko et al., 2007; Young & Rogers, 1998), loneliness (Kraut et al., 1998; Nalwa & Anand, 2003; Whang, Lee, & Chang, 2003), lower self-esteem, and life satisfaction (Ko et al., 2005). So it can be said that the internet addiction may be viewed as a sign of psychopathology. When thought in this context, the negative relationships between self-kindness, mindfulness, and internet addiction are not surprising.

However self-judgment, isolation, and over-identification which can be viewed as maladaptive components of self-compassion were found positively correlated with internet addiction. Among all other variables the self-judgment dimension has the highest correlation with internet addiction. Research on self-compassion generally demonstrated that self-judgment, isolation, and over-identification factors related positively to negative variables such as anxiety, depression, self-criticism, neuroticism, rumination, thought suppression, neurotic perfectionism (Neff, 2003a, b; Neff, Rude, & Kirkpatrick, 2007), and submissive behavior (Akın, 2009). In parallel recent studies on internet addiction showed that internet addiction related positively to decrease in social interactions, depression, loneliness, and lower self-esteem (Ko et al., 2005; Kraut et al., 1998). Consistent with these results in this study self-judgment, isolation, and over-identification were found positively related to internet addiction. Thus, it can be said that an increment in self-judgment, isolation, and over-identification will increase internet addiction.

The present research makes several contributions. First, it demonstrates that self-compassion associated with internet addiction. Second, to our knowledge, this study was the first to examine the relationships between these variables. However research investigating the relationships between self-compassion, internet addiction, and other psychological constructs are needed, to reinforce the findings of this study. It is also important to note that research on self-compassion is still in its nascent phases and more research will need to be done before any policy implications can be drawn.

This research suggests that the encouragement of self-compassion could be highly beneficial for diminishing internet addiction. Encouraging the development of self-compassion should be useful for students by helping them to counter destructive self-critical tendencies, recognize their interconnection with others, and deal with their emotions with greater clarity and equanimity (Neff, 2003a). This study has also several implications for prevention of internet addiction. Because, students who are addicted to the internet usually suffer from problems in their daily routine, school performance, family relationships, and mood (Young & Rogers, 1998), it is important for mental health professionals to develop interventional strategies for preventing internet addiction. Also students should be encouraged to make a healthy and timely use of the internet as an invaluable tool for enhancing their academic skills and worldwide communication (Ghassemzadeh, Shahraray, & Moradi, 2008).

Limitations of the study may be acknowledged. First, participants were university students and replication of this study for targeting other student populations should be made in order to generate a more solid relationship among constructs examined in this study, because generalization of the results is somewhat limited. Second, as correlational statistics were utilized, no definitive statements can be made about causality. And last, the data reported here for self-compassion and internet are limited to self-reported data.

Consequently, this research shows that self-compassion has a direct impact on internet addiction. Students high in self-judgment, isolation, and over-identification are more likely to vulnerability to internet addiction than are people high in self-kindness and mindfulness. Thus, the current findings increase our understanding of the relationships between self-compassion and internet addiction. We hope that our results may help educational agencies for designing suitable self-compassion development programs geared toward the college population.

REFERENCES

Akın (2009). Self-compassion and submissive behavior. *Education and Science, 34*(152), 138–147.

Akın (2008a). Self-compassion and achievement goals: A structural equation modeling approach. *Eurasian Journal of Educational Research, 31*, 1–15.

Akın (2008b). Scales of Psychological well-being: A study of validity and reliability. *Educational Science: Theory & Practice, 8*(3), 721–750.

Akın, Ü., Akın, A., & Abacı, R. (2007). Self-compassion Scale: A study of validity and reliability. *Hacettepe University Journal of Education, 33*, 1–10.

Armstrong, L., Phillips, J., & Saling, L. (2000). Potential determinants of heavier internet usage. *International Journal of Human-Computer Studies*, *53,* 537–550.

Bayraktar, F., & Gun, Z. (2007). Incidence and correlates of internet usage among adolescents in North Cyprus. *CyberPsychology & Behavior, 10*(2), 191–197.

Chou, C. (2001). Internet heavy use and addiction among Taiwanese college students: An online interview study. *Cyberpsychology & Behavior, 4*(5), 573–585.

Chou, C., & Hsiao, M. C. (2000). Internet addiction, usage, and gratifications the Taiwan's college students' case. *Computers & Education, 35,* 65–80.

Conway, D. G. (2007). *The role of internal resources in academic achievement: Exploring the meaning of self-compassion in the adaptive functioning of low-income college students.* Unpublished doctoral dissertation, University of Pittsburgh, PA, USA.

Davis, R. A., Flett, G. L., & Besser, A. (2002). Validation of a new scale for measuring problematic internet use: Implications for pre-employment screening. *CyberPsychology & Behavior*, *5,* 331–345.
Ferraro, G., Caci, B., D'Amico, A., & Di Blasi, M. (2007). Internet addiction disorder: An Italian study. *CyberPsychology & Behavior, 10,* 170–175.
Ghassemzadeh, L., Shahraray, M., & Moradi, A. (2008). Prevalence of internet addiction and comparison of internet addicts and non-addicts in Iranian high schools. *CyberPsychology & Behavior, 11*(6), 731–733.
Griffiths, M. D. (2000). Does internet and computer ''addiction'' exist? Some case study evidence. *CyberPsychology & Behavior, 3,* 211–218.
Griffiths, M. (2001). Sex on the internet: Observations and implications for internet sex addiction. *Journal of Sex Research, 38,* 333–351.
Gunaratana, V. H. (1993). *Sati. In mindfulness in plain English.* Somerville, MA: Wisdom Publications.
Hu, L. T., & Bentler, P. M. (1999). Cut off criteria for fit indexes in covariance structural analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6,* 1–55.
Huang, Z., Wang, M., Qian, M., Zhong, J., & Tao, R. (2007). Chinese Internet Addiction Inventory: Developing a measure of problematic internet use for Chinese college students. *Cyberpsychology & Behavior, 10,* 805–811.
Hur, M. H. (2006). Demographic, habitual, and socioeconomic determinants of internet addiction disorder: An empirical study of Korean teenagers. *CyberPsychology & Behavior*, *9*(5), 514–525.
Iskender, M. (2009). The relationship between self-compassion, self-efficacy, and control belief about learning in Turkish university students. *Social Behavior and Personality, 37*(5), 711–720.
İskender, M., & Akin, A. (2010). Social self-efficacy, academic locus of control, and internet addiction. *Computers & Education*, 54, 1101–1106.
Joreskog, K. G., & Sorbom, D. (1996). *LISREL 8 reference guide.* Lincolnwood, IL: Scientific Software International.
Kilimci, S. (2010). Integration of the internet into a language curriculum in a multicultural society, *The Turkish Online Journal of Educational Technology-TOJET,* 9(1), 107-113.
Kirkpatrick, K. L. (2005). *Enhancing self-compassion using a Gestalt two-chair intervention.* Unpublished doctoral dissertation, University of Texas at Austin.
Ko, C. H., Yen, J. Y., Chen, C. C., Chen, S. H., & Yen, C. F. (2005). Gender differences and related factors affecting online gaming addiction among Taiwanese adolescents. *Journal of Nervous and Mental Disease, 193*(4), 273–277.
Ko, C., Yen, J., Chen, C., Chen, S., Wu, K., & Yen, C. (2006). Tri-dimensional personality of adolescents with internet addiction and substance use experience. *Canadian Journal of Psychiatry, 51*(14), 887–894.
Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukopadhyay, T., & Scherlis, W. (1998). Internet paradox: A social technology that reduces social involvement and psychological well-being? *American Psychologist, 53*(9), 1017–1031.
Lin, S. S. J., & Tsai, C. C. (2002). Sensation seeking and internet dependence of Taiwanese high school adolescents. *Computers in Human Behavior, 18,* 411–426.
Martin, J. R. (1997). Mindfulness: A proposed common factor. *Journal of Psychotherapy Integration, 7*, 291–312.
Nalwa, K., & Anand, A. (2003). Internet addiction in students: A cause of concern. *CyberPsychology & Behavior, 6*(6), 653–656.
Neff, K. D. (2003a). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity, 2*(2), 85–102.
Neff, K. D. (2003b). The development and validation of a scale to measure self-compassion. *Self and Identity, 2*(3), 223–250.
Neff, K. D. (2009). Self-Compassion. In M. R. Leary & R. H. Hoyle (Eds.), Handbook of Individual Differences in Social Behavior (pp. 561-573). New York: Guilford Press.
Neff, K. D., Hsieh, Y., & Dejitterat, K. (2005). Self-compassion, achievement goals, and coping with academic failure. *Self and Identity, 4*, 263–287.
Neff, K. D., Kirkpatrick, K. L., & Rude, S. S. (2007). Self-compassion and adaptive psychological functioning. *Journal of Research in Personality, 41*, 139–154.
Neff, K. D., Rude, S. S., & Kirkpatrick, K. L. (2007). An examination of self-compassion in relation to positive psychological functioning and personality traits. *Journal of Research in Personality, 41*, 908–916.
Nisker, W. (1998). Mindfulness: The opposable thumb of consciousness (Chapter 3). In *Buddha's nature: A practical guide to discovering your place in the cosmos* (pp. 26–30). New York: Bantam Books.
Özad, B. E., & Kutoğlu, Ü. (2010). The use of the internet in media education, *The Turkish Online Journal of Educational Technology-TOJET,* 9(2), 245-255.

Ozcan, N. K., & Buzlu, S. (2005). An assistive tool in determining problematic internet use: Validity and reliability of the Online Cognition Scale in a sample of university students. *Journal of Dependence, 6*(1), 19–26.
Rosenberg, L. (1999). Breathing with the body (Chapter 1). In *Breath by breath: The liberating practice of insight meditation* (pp. 10–39). Boston: Shambala.
Yang, C. K. (2001). Sociopsychiatric characteristics of adolescents who use computers to excess. *Acta Psychiatrica Scandinavica, 104,* 217–222.
Yen, J., Ko, C., Yen, C., Wu, H., & Yang, M. (2007). The comorbid psychiatric symptoms of internet addiction: Attention deficit and hyperactivity disorder (ADHD), depression, social phobia, and hostility. *Journal of Adolescent Health, 41,* 93–98.
Yen, J. Y., Yen, C. F., Chen, C. C., Chen, S. H., & Ko, C. H. (2007). Family factors of internet addiction and substance use experience in Taiwanese adolescents. *Cyberpsychology & Behavior, 10,* 323–329.
Young, K. S. (1998). Internet addiction: The emergence of a new clinical disorder. *CyberPsychology & Behavior, 1*(3), 237–244.
Young, K. S., & Rogers, R. C. (1998). The relationship between depression and internet addiction. *CyberPsychology & Behavior, 1,* 25–28.
Whang, L. S., Lee, S., & Chang, G. (2003). Internet over-users' psychological profiles: A behavior sampling analysis on internet addiction. *Cyberpsychology & Behavior, 6*(2), 143–150.
Williams, J. G. (2005). *Forewarning: A tool to disrupt stereotype threat effects.* Unpublished doctoral dissertation, University of Texas at Austin, TX, USA.

STUDENTS' PERCEPTIONS OF ONLINE LEARNING AND INSTRUCTIONAL TOOLS: A QUALITATIVE STUDY OF UNDERGRADUATE STUDENTS USE OF ONLINE TOOLS

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ABSTRACT
The purpose of this study was to describe undergraduate students' experiences and perceptions of online courses based on interviews, observations, and online focus groups. I describe (a) motivational and learner characteristics within online classes, (b) the positive and negative aspects of online courses as experienced by students, (c) what instructors can do to improve the teaching of online courses, and (d) how undergraduate students' perceptions of the online learning environment and the tools used affects the selection of their approach to learning.

Data analysis from this study produced five primary findings across the four research questions. The first finding is the role of communication in shaping students' perceptions and approach to learning. The second finding is that participants did not perceive the negative attributes of technology to be inherent to the technology itself but in its use and implementations. Included in this second finding is that the tools used were not as important as the quality of communication and that the value assigned by students to any tool is influenced by the way the tool is implemented. The third is that course organization is key to student learning and success. The fourth is that student' approaches to learning appeared to be shaped by both the structure of the learning environment and the nature of assessments used in the online environment. Included in this fourth finding is students' perceptions of online learning as being less academically rigorous than their experiences in face–to–face education. The fifth is that students use nonacademic resources to locate information rather than the university library.

Presentation will consist of a summary of students' perceptions and an overview of methodology, including the movement from face-to-face focus groups to an online model and the use of think-aloud observations and interviews in collecting data on online student learning.

INTRODUCTION
The number of students taking at least one fully online class from an accredited university in the United States has grown significantly over the past decade. Between 2002 and 2007, the number of online students jumped 145%, from 1,602,970 to 3,938,111. Moreover, of the 17,975,830 students enrolled in degree–granting postsecondary institutions in the US in 2007, 21.9% were taking courses online (Allen & Seaman, 2008). This upward trend in online enrollment, which is expected to continue well into the second decade of the 21st century, clearly poses a number of challenges to the education community (Allen & Seaman, 2008). How will universities handle such a rapid increase in the number of online students? What alternative course delivery methods will best meet online students' needs? To date, much research has been focused on the former question and, in particular, on the technical aspects of online education such as access and information delivery. Research in the area of the latter subject is growing but has overlooked one critical aspect that needs to be understood if electronic learning (e–learning) is to be made more effective in the future: how do student perceptions impact their actions, approaches, and learning within the online educational environment?

PURPOSE
The purpose of this study was to describe undergraduate students' experiences and perceptions of online courses based on interviews, observations, and online focus groups. I describe (a) motivational and learner characteristics within online classes, (b) the positive and negative aspects of online courses as experienced by students, (c) what instructors can do to improve the teaching of online courses, and (d) how undergraduate students' perceptions of the online learning environment and the tools used affects the selection of their approach to learning.

SIGNIFICANCE OF THE PROBLEM
Research into the effectiveness of online instruction has looked primarily at individual implementations of instructional methods within a single class or set of classes taught by a single instructor (Means et al., 2009). Where this study differs is that it investigates online instruction in the typical faculty-developed course, that is, approaching online instruction from the student perspective in a mix of "typically" delivered and designed classes. These classes were not the exceptional online class designed to investigate a new or innovative online practice, they were simply what Edventures (2009) would term the current state of online instruction.

This study provides a rich, complex, and detailed picture of students within the online learning environment. By organizing the analysis of data and content around approaches to learning, learner–centered tools can be developed that promote deep learning approaches in undergraduate students during online learning experiences. Results from this study yielded recommendations for changes in the design of online and e–learning that encourage student learning that is aligned with faculty, student, and institutional perceptions of online education. Faculty may be expected to improve their online instruction through a clearer insight into the effects of course management tools.

Developing effective online learning environments is becoming a challenge for many universities. Current trends in education, which include shrinking funding, have spurred greater competitiveness among universities as they seek new ways to attract students not only in traditional environments but also in the online environment. In both, it is important to maintain academic integrity and to ensure high levels of student learning and by achieving a better understanding of students' needs in relation to their learning, online education can be improved an its value as an educational tool increased. By investigating ways that students perceive and interact with the learning environment, it may be that the design of the online learning environment can be better developed to support learning.

From a business of education standpoint, it is essential to remember that practitioners of education should not only be concerned with the number of degrees awarded but also the quality of student learning obtained in achieving those degrees. Thus, the focus of this study was on the students, who they are and how best they can be served.

DESIGN, COLLECTION, AND EVALUATIVE FRAMEWORK

The methodology used in this study was derived primarily from research into student learning and the selection of approach, in the tradition of Marton and Sajjo (1976), Entwistle and Ramsden (1983), Biggs (1987), Prosser (1999), and Ramsden (2002). Central to this approach is the perspective of the student regarding both the process and outcomes of learning and instruction. Qualitative data-collection techniques were used to obtain and describe undergraduate student views on online instruction, online learning tools, and instructional processes. Three stages of data collection were used in this study these were (a) one-on-one open-ended interviews, (b) think-aloud observation, and (c) online focus groups. The main data collection was student interviews. Data from think-aloud observations and online focus groups were used to confirm findings from the interviews. Data were collected between the Summer and Fall academic sessions of 2008 at two sites. Additional data were collected in the Summer of 2010. This study will continue and be updated with data collection resuming in the Summer of 2011.

SETTING

The sample consisted of 16 undergraduate students who had completed or were enrolled currently in an online course at one of the two universities. Students were recruited to participate in one or more of the data-collection methods; these were 11 in the interview process, 8 in the think-aloud observations, and 8 in the online focus groups: 5 in one group and 3 in the other group. Student participants were mostly in their mid–20s; 10 were female, and 6 were male. Three students participated in all three data-collection methods, five students participated in two of the data-collection methods, and eight students participated in only one data-collection method.

All students were drawn from religiously affiliated universities in Northern California. Both universities (S1 and S2) are primarily undergraduate universities, whereas university 2 (S2) has a more diverse population both in age and ethnicity. The graduate populations at both schools were not included in this study. University 1 (S1) is a medium–size, private university with a student population of approximately 8,500: about 5,000 undergraduate students and 3,500 graduate students. The undergraduate population has a male to female ratio of 45% to 55%, and about 35% of undergraduate students identify themselves as persons of color. Almost 60% of undergraduates are from California, with the others coming from throughout the United States and more than a dozen foreign countries. Between 65% and 70% of undergraduate students receive some form of financial aid: scholarships, grants, or loans. University 2 (S2) has an undergraduate population of approximately 5,500 and a graduate population of approximately 3,300. The ethnic breakdown for S2 is as follows: European American 39%, Asian American 20%, Latino or Hispanic American 15%, International 7%, African American 4%, Native Hawaiian or Pacific Islander 2%, and Native American 1%, with 11% unidentified.

Faculty participation in this study was not a requirement. Two of the faculty from S1 met with me prior to the start of data collection. The purpose of this meeting was to discuss the upcoming course offerings and the data-collection process. Currently, the majority of online course offerings at S1 are within the College of Arts and Sciences academic summer programs; the remaining offerings are in the business school and the law school.

Students in S1 for this study were primarily from the College of Arts and Sciences and the School of Business undergraduate programs. Students from S2 were drawn from business and nursing.

FINDINGS

The framework of approach to learning is used to analyze the data collected for this study. Three approaches to learning as described in the literature are called "deep," "strategic," and "surface." Strategic learning is sometimes called "approaching," depending on the researcher and the nature of the study. Deep learning is defined as examining new facts and ideas critically, tying them into existing cognitive structures, and making numerous links between ideas (Rosie, 2000). The deep learner is able to retain information and to organize materials in a variety of ways that aid in making meaningful connections that promote learning. Characteristics of deep learning include: looking for meaning, focusing on the central argument or concepts needed to solve a problem, interacting actively, distinguishing between argument and evidence, making connections between different modules, relating new and previous knowledge, and linking course content to real life. The strategic learner is a student who intends to achieve the highest grade possible through effective time management and organized study methods. Students exhibiting a strategic approach are focused on the assessment process (Entwistle & Ramsden 1983).

I examined participants' responses in interviews, think-aloud observations, and online focus groups; categorization of responses was based on the tools mentioned, statements of value, and perceptions of positive or negative effect on learning. The think-aloud observations and online focus groups served to confirm or add insights to data collected during the interview process. Sixteen undergraduate students who had completed or were enrolled in an online course at one of two universities participated in the study. Of the 16 students, 11 participated in the interview process, 8 in the observations, and 8 in online focus groups. Three students participated in all three data-collection methods, five students participated in two of the data-collection methods, and eight students participated in only one data-collection method.

Analysis of the data from interviews, think-aloud observations, and online focus groups produced five major findings. These five findings are (a) the role of communication in shaping perceptions and actions of students, (b) how technology is used not the technology determines its value, (c) the role of course organization for students success, (d) approaches to learning are shaped by students perceptions as are students determination of academic quality, and (e) students use nonacademic resources because of ease and familiarity.

The role of communication in online learning took many forms and was dominate in every data-collection method. Although students took online courses because they wanted independence and self-regulation, they also stated a desire for concise directions on everything from assignments and assessments to when and how to access course information. The expectations for communication went beyond just a need for direction. All of the participants expressed a view that faculty was "missing" from the educational conversation. How instructors communicate online was perceived to a limitation of online learning. When communication was perceived lacking, participants lower their approach learning electing for more strategic or surface learning.

Participants did not perceive the negative attributes of technology to be inherent in the technology so much as to its use and implementation. What participants expected was that communication technologies would be used in ways familiar to them and in providing a timely response to participants' educational needs. Indeed, poor technology implementation was mentioned in association with the lack of organizational structure found in some online instruction. In interviews, think-aloud observations, and online focus groups, participants expressed the perception that faculty lacking in technology skills were likely to use or implement technology in a way that resulted in confusion.

All 16 participants stated that the main reasons for pursuing online instruction were flexibility and self–control within the learning environment. Participants perceived online learning to be a convenient alternative to traditional classroom learning but indicated that convenience came with a price: in gaining independence, self–directed learning, they were losing direction from and communication with instructors. In some instances, this tradeoff was perceived to decrease the educational and academic value of the learning experience. For these participants, academic value was perceived to come from interaction and engagement from peers and faculty. Participants indicated that without necessary direction from faculty online learning allows for an approach to learning that is more surface– or strategic–oriented than is the case in the traditional face–to–face classroom experience.

The resources provided by universities for students research and information gathering were perceived to of less value then nonacademic tools. The use of nonacademic database sources was especially true when participants were asked to use online databases to perform research. During the think-aloud observations, participants used Google® and Wikipedia® before those resources provided by the university. When asked to explain their use, participants stated that Google® and other free tools are familiar and do not have the access restriction placed on them that university systems have. Additionally, participants stated that the university tools were cumbersome and hard to navigate.

In summary, tools used for communicating or conducting research were not as important as the communication itself. Perceptions of value for any tools used depended not on the tool but on the speed and consistency of communications. Participants did not perceive the negative or positive attributes of tools or technology to be inherent to the technology itself, but to its use and implementations. When faculty were perceived to be unresponsive, it was not the tool that was perceived to be of little educational use but the level of communication. When faculty were perceived missing from the educational conversation the academic quality was perceived diminished compared with face-to-face instruction. When the academic quality was perceived low, participants exhibited a strategic or surface approach to the learning.

RECOMMENDATIONS FOR FUTURE RESEARCH

Although this study confirmed past research results (Cotton, 2006), it is believed that a more thorough study will provide additional data on students' perceptions and use of the online environment in the promotion of learning. Although the study was limited to two religiously affiliated institutions with limited online programs, a larger study would offer results that could be applied more generally. This study was conducted in primarily short 5-week summer online courses with limited enrollments. The exceptions to the summer courses were two short 5-week courses at University 2 (S2) in the Fall of 2009 and the OMIS course taught by me during the regular 10 week sessions at University 1 (S1). It is possible that selection of a small range of online courses produced a limited range of course interactions. Because of this limitation, a larger study conducted in a wider range of disciplines may produce a different set of results. One such study, just completed and published, showed similar findings, yet was able to look more closely at students' approach to learning through a wider set of interviews and other data-collection methods (Ellis & Goodyear, 2010). Ellis and Goodyear were able to draw a relationship between online discussion and student approach to learning. In particular, Ellis and Goodyear found statistically significant relationships between deep approaches, cohesive conceptions, positive perceptions of the learning context, and higher levels of student performance. Although the collection of student performance data can be problematic, more studies investigating students measured use of approach in relation to student outcomes in online learning could prove useful.

Perceptions of communication played an important role in the results of this study. Although this study relied on students' perceptions of communication and observations of their actions within the online environment, actual communications were not assessed. Future studies that look at possible links between faculty use of communications, the content and amount and communications online, and the perceptions of students may be warranted.

This study and others have investigated only a few of the possible relationships between perception of the online environment, the tools used, students' approach to learning, and students' perceptions of learning. A more focused investigation of student perceptions of the design of online learning, including Internet resources, the role of community, and social networking is needed. Although Internet resources and community and social networking were mentioned in this study, they may play a larger role in student communication and learning than was described in this study.

An additional phenomenon not investigated fully by this study is the link between perception and outcome. Assuming a link between perception and outcome based on past research may not be sufficient when considering the online environment. An investigation of the relationships between online perceptions, approach, and outcomes is an area that may merit further research.

Comparing students' expectations and actual use of communication technology with the use and expectation in the online classroom could inform future studies on student perceptions of online learning. Faculty use and knowledge also may effect student perceptions. Additional factors not investigated in this study include (a) institutional beliefs around online learning, (b) the place of online learning in the strategic plan of the university, and (c) the implementations of teaching standards related to online instruction.

Studies investigating faculty perceptions and training are numerous; however, the link between faculty training in the use of standards for the development of online courses and student perception and outcomes is not well understood. What participants say they want in an online course and the standards as written into resources such as the Rubric for Online Instruction (ROI) are similar. These similarities include more communication, faster response time, and more engagement with peers and faculty. The standards used in the ROI, and other such tools, are widely used teaching the development and assessment of online education across the United States and other countries, but studies linking the standards contained in the ROI to student perception are limited, as are studies linking the use of the ROI to either student approach or increased student outcomes. An investigation of the effects of the ROI on perception, approach, and outcome may provide educators a better understanding of how best to design online education in the future. One possible outcome of such research may be that including basic teaching strategies not specific to the online environment are not necessary in tools like the ROI and that including such information diminishes there value to faculty.

Although not specifically a limitation, one area of concern within this study is that participants' statements of response time was not followed up on during data collection. All participants stated that faculty and students were unresponsive at some time yet a precise time was never ascertained. Investigating what is an appropriate response time for e-mail, discussions, and assignments may be an area of further research.

REFERENCES

Allen, I. E., & Seaman, J. (2006). *Making the Grade: Online Education in the United States, 2006*. Olin Way, Needham, MA 02492-1200: Sloan Consortium

Biggs, J. (1976). On Qualitative Differences in Learning: I-Outcome and Process. *British Journal of Educational Psychology, 46*, 4-11.

Biggs, J. (1979). Individual differences in the study process and quality of learning outcomes. *Higher Education, 8*, 381-384.

Biggs, J. (1987). Student Approaches to Learning and Studding: Study Process Questionnaire: Manual. Melbourne: Australian Council for Educational Research.

Cotton, D., & Gresty, K. (2006,). Reflecting on the think-aloud method for evaluating e-learning. British Journal of Educational Technology, 37, 45-54.

Entwistle, N., & Ramsden, P. (1983). Understanding Student Learning. New York: Nichols.

Ericsson, K. A., & Simon, H. A. (1993). Protocol Analysis: verbal reports as data (Revised ed.). London: MIT Press.

Marton, F., & Saljo, R. (1976). On Qualitative Differences in Learning, Outcome and Process. British Journal of Educational Psychology, 46, 4-11.

Richardson, J. C., & Newby, T. (2006). The Role of Students' Cognitive Engagement in Online Learning. The American Journal of Distance Education, 20, 23-37.

Richardson, J. (2003). Approaches to Studying and Perceptions of Academic Quality in a Short Web-Based Course British Journal of Educational Technology, 34, 433-442.

Richardson, J. (2005). Students' Approaches to Learning and Teachers' Approaches to Teaching in Higher Education. Educational Psychology, 25, 673-680.

THE BUSINESS COMMUNICATION COURSE AND THE MOODLE FRAMEWORK SYSTEM

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ABSTRACT
In this article I will argue that the use of learning content management systems is also justified in full-time education, especially in business education and communication studies. Nowadays not only multinational companies, but domestic medium enterprises also manage the training of new employees and existing staff with LCMSs. Companies in Hungary's financial sector are cutting edge in the development of electronic learning objects, and base employees' training on these new technologies. That is why it is extremely important for students to get acquainted with learning management systems and other web-based applications as tools that support the learning process and also as sites of communication. I will present the business communication Moodle course, which was introduced to international business and commerce and marketing studies in the 2010/2011 academic year. I want to present the wide range of web2.0 applications that can be used to explore the fields of business communication.

INTRODUCTION

Today, when our students (as well as our colleagues) spend a significant proportion of their spare time on Facebook and similar networking sites and virtual communities, communication cultures and expectations in the workplace also seem to be changing. (More than half of the Hungarian Internet users between 18 and 64 enter at least one networking site - iWiW, Facebook, Myspace, Twitter etc. – each day according to domestic surveys. www.technet.hu) Professional blogs, analyses, audio and video commentaries published on the Internet (message boards, profile pages, photo, file and other content sharing sites) have by now become part of business communication, and consultations can also be held online in education. However, when our students are asked if they know what web 2.0 means or what is behind the expression semantic web, we invariably get negative answers. Therefore it seems necessary to set some concepts, phenomena and applied tools straight, even within the sometimes rather narrow frames of subject curricula. The business communication course offers a good opportunity for this. Its perspective as well as its content (curriculum) enables it to follow technological changes felxibly, and the innovations of social and new media can be presented at the attendance courses and alongside them. The question is whether the institutions and the students are open to receive this, and how well the instructors themselves are prepared for it.

Teachers

As regards the skills of teachers, the National Institute of Vocational and Adult Education has provided accredited in-service teacher training programs related to e-learning for years, under titles like „E-learning, „The School of the Future", „From Synopsis to E-learning curricula", „E-textbook – developing electronic curricula in the framework system", etc. (https://www.nive.hu) (The author of the present paper also participated in such training courses.) However, no imperative other than their self-imposed professional standards and motivation is in force as yet in domestic practice to incite teachers to participate in these programs. (The new act on public education and act on higher education, the model for teachers' careers, as well as the principles of quality assurance are currently being outlined as part of the reform measures of the second Orbán government that came into office last year. The plans are as yet subject to heated debates, and they are also rejected by the Teachers' Union.)

The composition of the teaching staff in the institution in question (Budapest Business School, College of International Management and Business – BGF CIMB) is also relevant to our theme; it is summed up in the following table:

	2008	2009	2010
Holds academic degree	32%	36%	37%
30 years old or younger	4%	3%	2%
31-45 years old	30%	35%	39%

46-54 years old	21%	20%	17%
55-62 years old	33%	30%	31%
older than 62	12%	14%	14%

Table 1: Age of instructors and proportion of instructors holding an academic degree
(Source: Supplements No. 4.1 of the yearly reports of BGF CIMB for 2008, 2009 and 2010)

The table shows that similarly to other universities and colleges, the age group in which the educational activities were definitely not accompanied by the use of computers from the beginning is represented at around 62-66%. They were the ones from whom the appearance of web technologies demanded the greatest shift in attitudes and equipment use. Their age, on the other hand, may also give rise to certain concerns regarding the issue of replacement.

Students

We do not doubt that our students are open to everything new, although we sometimes get a distressing picture of their motivation and diligence. For example, it is not clear why they try to catch up with a whole semester's study during the 1-2 days before the exams instead of continuous learning. (This is what we can conclude from teachers' accounts, our own teaching experiences and, as we shall see later, the course statistics available in the framework system. See also Kriskó, 2011a on this topic) It is not clear why they claim that they are not familiar with the framework system, wen it is built up of tools and modules they already know from other computer applications.

Participants of the study were groups of first year full time students of international management, commerce and marketing. Most of them were first degree students who took the given course for the first time. There was a total of 6 seminar groups with some 30 students each. Due to the limited length of the present paper, I will concentrate on the business communication course of the international management program in this lecture, and will only present data from the commerce and marketing program as a basis of comparison where this seems relevant.

The Business Communication Course

The subject taught is business communication, which consists of a theoretical lecture series and a seminar course. Both the practical and the theoretical courses take place in two hours biweekly. (The teacher of the theoretical subject and the seminars is not necessarily the same person.) The aim of the subject is to acquaint students with the basic know-how and knacks with which they will be able to communicate adequately in the wide-ranging field of business life.

To this end, all we need to do is involve students in communication, in the traditional as well as in the virtual classroom. If we take the interactive view of communication (namely, that it proceeds towards something and has a definite end, and every participant has to make an effort in order to achieve the common goal) as a starting point, we can witness a fortunate encounter of the subject and the method under the aegis of web2.0. The primary aim of the course is to convey to the students the message that „[…] in order to profit more from the knowledge base of a community, first of all you have to be an active participant of the community in question." „[…] the more you read and write, share and communicate, the more the opportunities that are close to you will find you." (Kulcsár, 2008, no page number)

Interactivity in terms of communication

To stay on the field of communication, my courses can probably be most easily described in Newcomb's interactive model (Newcomb, 1966), as communicative acts in which we communicate as A (teacher) and B (students) about X (communication, business communication), and we mutually orient to each other and the topic (X) as well. In the system of group exercises, all this means that students produce and experience the same communicative acts within the groups, and the group exercise will be the reflection of some state of balance within the group. Their solutions will reflect that they acquire knowledge about each other during the work, and also about X (communication) and other Bs (who assume the roles of A' or A'B in the new models), and their attitudes towards the Bs and X also change. All this results in a multiple coorientation network, and leads to what the literature defines as networked learning. The latter is a process in which the informal, networked exchange of information supported by electronic facilities (LCMSs) dominates, and which turns learning into a networked process, where the students also learn from their peers. (Bessenyei, 2007)

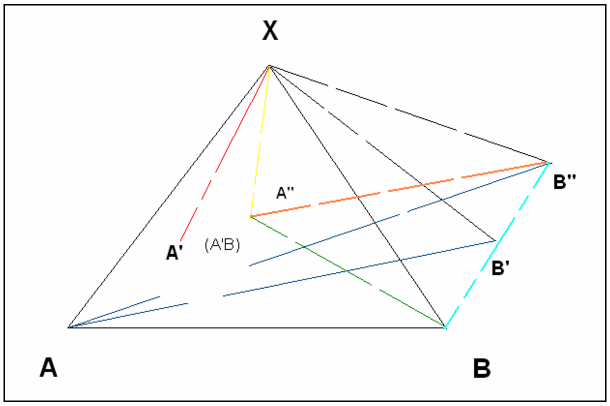

Figure 1: The extension of Newcomb' model for communication during a course
(image created by the author)

As a teacher, I aim to focus on what I can add to this, so that the Bs develop positive attitudes with respect to X (communication), and aim to incite them for further study, even if this will not be manifested right there and then or during the course, only years later in their professional practice. If being open to others and being oriented on a subject together happens at a site like the LCMS, the returns are twofold. It leads us to a site which is not included in classical business communication textbooks as yet, the systematic analysis of which is ongoing, and the experience has the power to increase the credit of group communication, group thinking and Web 2.0. All of this is implemented with a method that employs the current paraphernalia of business life, and integrates them in the learning process. (Kriskó, 2011b) Thus blogs, the e-portfolio, the time band, the message board and all the other applications help update our whole set of business communication tools (up to the point of video conferences).

To all those who ask about the areas of pedagogy and IT, I would say that I am thinking in terms of the first step of connectivism. My attempts aim to make the Internet and virtual spaces part of our everyday lives, sometimes even against institutional powers that withhold us, and to find a place for group work that is not subject to simultaneous physical presence among our acts of communication and our sites, while our theme is business communication all the time.

REASONS FOR USING MOODLE

The framework system developed in New Zealand is fairly widespread worldwide, and has been one of the most popular in Hungary, too for several years. (There are 50519 registered Moodle pages in 211 countries and 266 in Hungary - http://moodle.org/sites/, download: 03.21.2010. 13:46h) „Moodle is an open source program package that enables the complex implementation of learning and teaching by the provision of a learning environment." (http://docs.moodle.org/hu/A_Moodle) It is practically an LMS also equipped with Web2.0 applications.

It was introduced at the BGF CIMB in the year 2009 as a pilot project, upon the initiative of technical language instructors. The first users were the staff of the German language department, who primarily used it to publish language placement tests. The use of functions supporting learning, editing curricula and group work has become prevalent by now, but the faculty is still in the phase of the initial steps. The system has 5163 users and 33 courses are available, which is a significant number if we consider the fact that the faculty does not offer distance education. However, the high number of users is misleading in that every active student of the department has been given a user account, but not everyone has an active course to take as yet, due to the small number of courses. For the time being, there is no full scale course management within the system.

Business Communication subject curriculum

In the following section I present the structure of the business communication course provided in the programs of commerce and marketing and international management. The subject has different contents in these two programs, one reason for which is administrative: the two subjects are managed by different departments (Department of Applied Communication and Department of Social Communication), and, on the other hand, the programs situate the subject in different curricular networks. Therefore in the following section I present the teacher's conception and the first results (not analysed in detail so far) through the course offered to students of international studies.

The major themes are: 1.) Organisational culture and behavior, 2.) Job application, CV, interview 3.) Internal communication, negotiation, meeting, 4.) Written communication, writing tools, 5.) Decision making in a group 5.) Organisational communication, mass communication.

Students engage in group work throughout the semester, and are given written assignments to be submitted at the end of each class. After the first three group exercises – that is, after six weeks' time – they receive a written evaluation of their performance through Moodle, broken down by the individual chapters of the curriculum. On the last occasion, they give group presentations of their work during the semester.

Curriculum elements in the Business Communication course

In the case of the seminar, there was no traditional, paper based material among the compulsory readings. A textbook available in electronic form was included (Béla Buda: *A közvetlen emberi kommunikáció szabályszerűségei*), and a Power Point summary (based on different textbooks) was compiled for each topic. References were included on the slides in each topic to encourage participants for further research and reading. Any aids that offer specific guidance or secure subsequent control for elaborating the group exercises during class are available as a website in Moodle. In addition to the above, test questions and a mini self-check (10-question true or false) test offer support to preparation, and a teachers' blog has also been available since spring. Students have been informed about the existence of the former in a message sent through the Neptun system in each course, and its availability has also been demonstrated during class.

The blog has a double function: on one hand, it enables the presentation and sharing of spontaneous assignments during class, which are based on relevant current events of public life (Fukusima and the nuclear emergency, or what are the major principles of crisis communication), on the other hand, assignments are offered for marks, in order to help students apply what they have learned in real life situations. (What is the difference between a statement made in a live radio program by an executive of the Hungarian Television on the program policies of the channel, and the same person publishing preliminary plans ahead of time in his professional blog, and this leads to dismissal? Does the director of the Festival Orchesrta criticise the work of the government in an interview given to a foreign paper as a private person?) It would be important to develop critical thinking in students.

Among the above elements, it was the blog from which I was expecting a breakthrough, because it was the one that secured the widest frames for the study of communication phenomena and the initiation of dialogues. Theoretical considerations can be made more colourful by multimedia elements, and as this ensures a more informal tone, humour and irony also have a place here. Individual themes are meant to illustrate that what we talk about during the sessions is very human, everyday, subjective, manipulable, and any related knowledge can be used to our own ends.

Experiences in the Business Communication course of autumn 2010/11

The following diagram is meant to demonstrate that most students only entered the course on the eve of the final test of the semester, and this was when they reviewed the material and aids uploaded there or read the detailed description of requirements or skimmed through the compulsory and recommended reading list. One might say that there was no activity in the Moodle course before that. 8 students from the 30-member group did not visit the Moodle course at all. The average time spent in the system was 10.4 minutes. The attendance sessions also resembled lectures rather than seminars. It was difficult to initiate dialogue, there were no questions that catalysed the debate. There was not a single forum comment or response (except for the teacher's comments on the requirements, recommended literature, links and other relevant issues). Not one student began to compile an e-portfolio, and not one participant of the course started a blog.

This was when the idea of group work was raised, and the necessity of active tutoring was admitted. This gave rise to the rethinking of the whole conception, aiming to generate active participation by students through the combination of the interactive view and Web2.0.

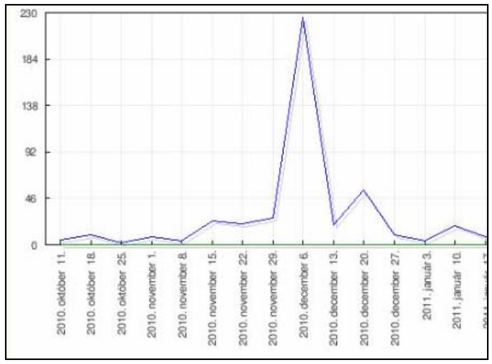

Figure 2: Student activity in the autumn course
(Source: http://moodle.kkfk.bgf.hu/)

Experiences in the Business Communication course of spring 2010/11

The academic year is still on at the time of writing, 3 weeks are left from the term time, but the available data already point to some progress towards dialogue-based work. As opposed to the previous semester, more than half of the students logged in to the system and entered the course after the first contact hour. The rate of viewing each element of the curriculum varies widely between 12 and 90%. The only item visited frequently in every course is the Job search and Job Interview Encyclopedia created in a Wiki format (a visiting rate of 180% with respect to active course members).

The first steps of the realisation of the teacher's intention are seen in the G7 group (top right diagram of Figure3), with a continuous activity around 20. (Unfortunately, this also reflects the extent of student interest experienced at the attendance sessions.) As a comparison: attendance at the course varies around 3 and 5 per cent in the marketing program.

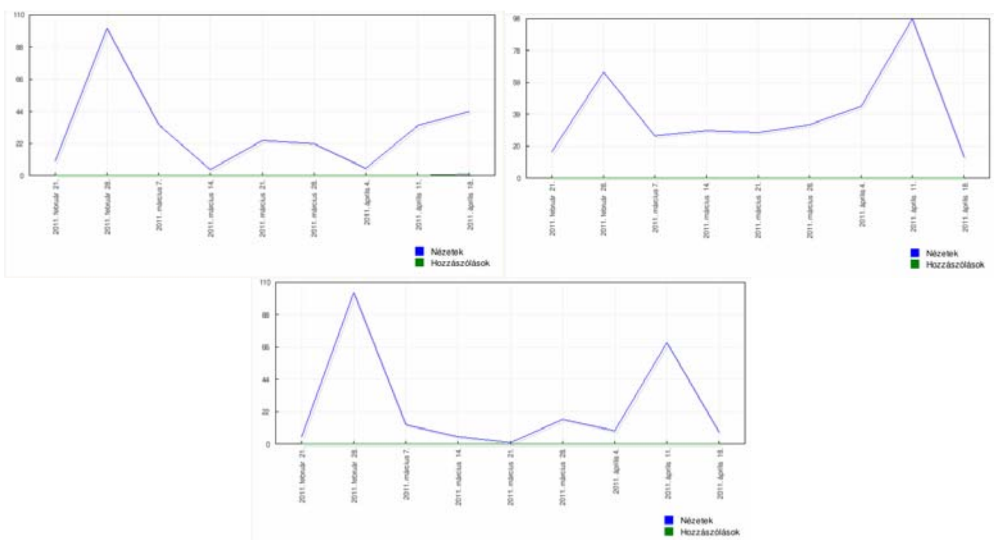

Figure 3: The activity of the 3 spring groups (G5, G6, G7)
(Source: http://moodle.kkfk.bgf.hu/)

However, the number of views for course elements was 1.5-2 times higher than it was in the previous semester, calculated for the corresponding period of time. This is most striking in group G6. The average amount of time spent in the system is expected to be as high as 20 minutes/person – due to the fact that students still only use Moodle for downloading course material most of the time

It remains a question whether stronger and more compulsive methods should be used for promoting the use of electronic facilities (e.g. compulsory exercises to be submitted through the framework system, on a weekly or be-weekly basis), as the amount of course material required in this subject is small. It would be much more important to see interpersonal dynamics, processes and states in practice, and to get to know students' own set of communication tools in vivo and extend them to web-based tools that also enable group work from the distance.

SUMMARY

We have found data (course journals and personal activity lists) supporting the finding that we hold our classes to 4-6 students per group, which is reinforced by the personal feedback by other teachers on their experiences at attendance sessions. Naturally, this is enough to generate tractive force in each group, but does not secure permanent participation by each course member. A positive reading could be that students have first-hand experience of the difficulty of work organisation, and face the burden that slackers constitute, as well as the difficulties of motivation and engagement, but the concerns we are faced with in the phase of evaluation are twofold. It is difficult to separate the reward of work inside and outside the classroom if we evaluate the work itslef and not the process. If the submitted work is evaluated favourably thanks to the most diligent and most apt group members, everyone can equally take part in the success. This is realistic, but it will cause a tension between aptitude in the subject and the mark received in many cases.

There are, however, some positive returns as well. The atmosphere of the attendance sessions and the standards of the submitted works have improved, the jointly prepared assignments are more professionally adequate and comprehensive than individual students' works have been or used to be. Students have learned to think in a group, and as a result of the themes discussed, they are more reflexive on their participation and the biases within the group. Also, more questions are raised at the attendance sessions. Apart from a few exceptions, if a group member misses a meeting, he or she asks for an extra assignment, so they will not make the impression of taking a smaller part in the group work.

In sum, we can say that this chosen track has made the subject that students had been averse to more popular, it initiated a dialogue, and finally created a distance from the teacher's style at the attendance sessions and made them more like an event of joint thinking characterising seminar work. Even if at a less profound level, they acquired some experience on the operation of framework systems, and gained an insight into the view of electronic learning and teaching, which has been gaining ground extensively. They have approached Facebook more consciusly as a site of communication, as a tool for self-management and civil will formation. This is a good preparation for their studies in (online) marketing next year.

REFERENCES

Bessenyei, István (2007): *Tanulás és tanítás az információs társadalomban. Az e-learning 2.0 és a konnektivizmus,* www.ittk.hu/netis/doc/ISCB_hun/12_Bessenyei_eOktatas.pdf, downloaded at: 2011-04-19

Kriskó, Edina (2011a): *Moodle a felsőfokú szakképzésben – Az Üzleti kommunikáció szeminárium tapasztalatai*, In: III. Oktatás-informatikai Konferencia Tanulmánykötet, (1) (pp.168-174), Budapest

Kriskó Edina (2011b): *Kurzusmenedzselés a web2.0 árnyékában*, (conference presentation) Nemzetközi Neveléstudományi Konferencia, Kolozsvár, 2011.04.16.

Kulcsár, Zsolt (2008): *Web2.0@munka*, http://www.crescendo.hu/2008/08/07/web20munka), (no page number) downloaded at: 9. March 2011, 15:23

Newcomb, T. M. (1966): An Approach to the Study of Communicative Acts, In: Smith, Alfred G. (ed.): *Communication and Culture*, (1) (pp. 66-79) Co.: Holt, Rinehardt and Winston, New York

Pete-Kató-Palovits (2010): A kommunikáció interaktív felfogása, In: *Kommunikációtudományi Nyitott Enciklopédia* (Alkalmazott Kommunikációtudományi Intézet), (no page number) http://ktnye.akti.hu/index.php/A_kommunik%C3%A1ci%C3%B3_interakt%C3%ADv_felfog%C3%A1sa, downloaded at: 12 March 2011, 12:17

Supplements 4.1 of the yearly reports of BGF CIMB for 2008

Supplements 4.1 of the yearly reports of BGF CIMB for 2009

Supplements 4.1 of the yearly reports of BGF CIMB for and 2010

http://docs.moodle.org/hu/A_Moodle, downloaded at: 18 March 2011, 10:12

http://moodle.kkfk.bgf.hu/, last downloaded at: 18. April, 2011, 19:42

https://www.nive.hu, downloaded at: 15 March 2011, 14:22

http://www.technet.hu/hir/20110310/a_magyar_nok_facebookoznak_a_magyar_pasik_twittereznek/ downloaded at: 18 March 2011, 10:17

THE CHINESE INPUT CHALLENGES FOR CHINESE AS SECOND LANGUAGE LEARNERS IN COMPUTER-MEDIATED WRITING: AN EXPLORATORY STUDY

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ABSTRACT
This paper reports an exploratory study on Singapore secondary and primary school students' perceptions and behaviors on using a variety of Chinese input methods for Chinese composition writing. Significant behavioral patterns were uncovered and mapped into a cognitive process, which are potentially critical to the training of students in inputting Chinese via computers. Due to the cognitive complexity of Chinese computer input, there seemed to be a misalignment between the perceived effectiveness of these input methods and their actual benefits. They will only be effective if the composition writers possess appropriate language abilities and technical skills. In addition, as secondary school composition writers had higher level linguistic and technical skills, for example, the ability to guess the correct pinyin (a Romanized phonetic scheme that is required for Chinese text input) based on experience, they were more likely to view the input system favorably than primary school students. This has implications in how to prepare primary school students for information and technology mediated composition writing in Singapore. Pinyin and technical skills should be introduced as early as possible for them to appreciate the benefits of computer-mediated Chinese text input and subsequently, composition writing.
Keywords: Computer-aided Chinese learning, Chinese compositions, Chinese computer input, Qualitative methods, Student perceptions

INTRODUCTION

There is a keen interest in promoting the learning of Chinese globally. However, given the non-alphabetic nature of the Chinese script, it is found that learners face substantial problems in mastering the language (Wong, Boticki, Sun & Looi, 2011; Wong, Chin, Chen & Gao, 2009; Wong, Gao, Chai & Chin, 2011), especially for the purpose of reading and writing (Fu, 2005; Mori, Sato & Shimizu, 2007).

In Singapore's context, although over 75% of the population is ethnic Chinese, Chinese Language (Chinese) education faces many challenges. Since 1984, Chinese has been taught as an isolated second language (L2) subject in the primary and secondary schools. The amount of time allocated for learning Chinese in the schools is about two and a half hours weekly. In addition, there is a dramatic decline of using Chinese at home. According to the Ministry of Education's (MOE) statistics, 9.3% Primary 1 (7-year-old) students of Chinese origin used English at home in 1980, but the figure soared to 45% in 2003 (People's Daily Online, 2004). Hence, Singaporean students who have intensive training in English since they were young find it a challenge to learn Chinese (Liang, 2000). Moreover, their Chinese oral skills are relatively better than the writing skills (Liang, 1999; Wong, Chin, Chen & Chai, 2011).

Indeed, there is a need for Chinese Language educators to find more effective ways to facilitate Chinese learning. One possible solution is to exploit the affordances of computer technologies. In particular, a recent development in the Chinese education landscape in Singapore is the MOE's plan (January 18, 2011 press release) of phasing in computerized input for selected sections, including compositions, of national Chinese exams between 2013 and 2015. Therefore, it is timely to study the feasibility and challenges in introducing and reinforcing the computer input in Chinese writing among typical Singapore students.

This paper reports an exploratory study with twelve secondary and six primary school students to determine their perceptions of using selected ICT tools to write Chinese compositions rather than the traditional way of writing with paper and pen. The study was conducted to determine the range of student views about the use of technological tools in the transcribing process and the composition writing process. According to American Heritage Dictionary, one of the definitions of the term "transcription" (n.d.) is that *"something written, especially copied from one medium to another, as a typewritten version of dictation."* In the context of paper-and-pen writing, transcribing involves handwriting and spelling (Berninger & Winn, 2007). In this paper, transcription refers to the input of (Chinese) text on the computer (e.g., Crook & Bennett, 2007). This paper has attempted to answer the following research questions:

1. How did the participants perceive Chinese composition writing?
2. How did they perceive the ICT-mediated Chinese transcribing process?
3. What are their usage patterns for the various ICT tools for Chinese transcribing?

Research question one was included in this study because it formed the context for the researchers to understand the students' perspectives in research question 2 and 3.

LITERATURE REVIEW

Challenges in Chinese learning

Chinese literacy began over three thousand years ago with writers etching the plastron shell of the turtle (Chang & Chang, 1978). As the technology of literacy evolved, first with rice paper and now with the computer and the Internet, this tradition of literacy has also evolved (Bloch, 2004). Technology tools for writing are becoming more user-friendly and there are many affordances of the tools that can be employed to enhance the writing performances of students. Computer-based technologies such as word processors, e-dictionaries, automated writing templates, web blogs and voice input systems are just some examples. Given these tools, Sullivan and Porter (1997), and Selfe (1999), argued that electronic writing (including word processing, e-mail, WWW) is the key for future writing. Writing in the 21st century would largely mean electronic writing. However, integrating technology into classroom teaching and learning is a complex process that needs iterative designs and experiments (Pelgrum, 2001). While there was some research in integrating computers for writing in other languages (see below), employing computers for Chinese writing seemed to be rare or perhaps under-reported in English Language journals. This phenomenon might be due to the unique characteristics of Chinese words. A Chinese input system for the computer was not invented until 1976 (Qiu, 1990). Input systems that were both user-friendly and easily accessible to students did not emerge until the 1990's (e.g., Chinese Star). This might help to explain the lack of research in this area.

Scientific research (Washington Observer Weekly, July 23, 2003) suggested that Chinese takes more "brain power" than English to learn, as both left and right temporal lobes become active when Mandarin speakers hear Chinese, whereas only the left lobe is active when English speakers hear English. For the learners of Chinese as L2, learning the Chinese script is the most difficult task, including the recognition, reading, and writing of characters (DeFrancis, 1984; Ke, Wen & Kotenbeutel, 2001; Wong, Chai & Gao, 2010; Zhu & Hong, 2005). Fan, Tong & Song (1987) claimed that the logographic nature of the Chinese script constitutes the hurdle to memorization. Shen (2004) attributed the challenge to the retention of the sound, shape and meaning of a character in the learner's long-term memory and the instant retrieval of these three elements. Ho, Ng & Ng's (2003) study suggested different word recognition strategies are required for Chinese as compared to English (or any other alphabetic script), which makes it even harder for a learner whose first language is based on a alphabetic writing system to pick up Chinese.

Could such a difficulty translate into higher cognitive load for children learning to write Chinese compositions? Graham's (1990) study in English writing process may shed light on this issue. He observed that writers' conscious attention to handwriting and spelling in paper-and-pen-based English writing can interfere with other writing processes. McCutchen (1988) proposed that such skills are so demanding for beginning writers that they minimize the use of other essential writing processes, such as planning and revising. However, the researchers argued that such problems would occur, perhaps more seriously, in Chinese writing as well, due to the logographic nature of the Chinese script as discussed above.

ICT-mediated writing pedagogy – the studies

There is little doubt that ICT-mediated writing influences the writing process (Kang, 2011; Penington, 2003) and research in this area has been conducted since early 1980s. Reed (1996) observed a research shift for ICT-mediated writing and the design of the study. According to his survey, pre-1987 studies tended to be tool-centric experimental designs. The general findings were that students in computer groups performed better than those in non-computer groups. Post-1987 research was better grounded in research designs which were built on theoretical frameworks; there were much more pedagogically rich treatments as well as greater focus on the writing process, thus a reduced need for control groups.

With this shift, research has begun to uncover areas that may not benefit from ICT-mediated writing. Peckham (1996) cautioned practitioners in integrating technology with existing writing pedagogy. He found that the move between in-class and online peer responses is not seamless. Vician and Brown (2000) argued for the need to carefully craft writing assignments to align with their intended outcomes. Erickson's (1992) study showed that the quality of compositions written on computers depends on variables like writers' experience, maturity, technical competency, and instruction received in the writing process. Wolfe and Manalo (2004) further argued that the imposition of keyboard composition requires students with less computer experience to perform the equivalent of translation in order to produce the text, which is not part of their natural written communication process. It is likely that such an effort would be more pronounced for L2 learners because they would perform a double translation – native language to L2 and then L2 to keyboard strokes. What make the ICT-based writing task even more challenging in Chinese compositions are the indirect Chinese input methods – either phonetic- or component-based input methods as the means to Romanize or code the logographic characters – that requires writers' additional mental processing, that is, recalling the pronunciations or decomposing the "shapes" of individual characters, among others (Xie, 2001). All these findings pointed to the need for educators to help learners overcome the technical challenges that they might face before the advantages of ICT-mediated compositions can be realized.

ICT mediated Chinese writing – Perceived Advantages and Challenges

The past decade has witnessed active studies in applying ICT to Chinese teaching and learning (see a comprehensive survey in Bourgerie, 2003). Since ICT can provide great opportunities for Chinese teaching and learning, it is imperative for Chinese teachers to tap the potential of ICT to enhance Chinese learning. Specifically, there are an increasing number of discussions related to IT-mediated strategies for composition pedagogy in Singapore. Integrating ICT into the Chinese curriculum had raised individual learners' confidence and aroused their interest in learning Chinese (Lim, 1999; Zhang, 2009). Lim (1997) argued that IT support offering great advantages in Singapore students' Chinese composition exercises, including the nurturing of creative and abstract thinking. Therefore, Sim (2005) advocated the construction of a pedagogical model for online Chinese compositions in order to overcome the common challenges faced by Singapore students in traditional paper-and-pen-based compositions.

As such, in order to ensure the effective use of ICT in Chinese compositions, it is vital to understand students' perceptions and experiences of using ICT for Chinese compositions, including the linguistic and technical difficulties that the young learners of Chinese as L2 may face due to the introduction of the new writing medium.

METHODS

Background Information and Sampling

Three qualitative case studies were conducted for this research between September 2006 and February 2007. Case study one was conducted at a co-ed neighborhood secondary school (Sec A). Case study two involved a boys' school (Sec B). Both studies involved six Secondary 3 (15-years-old) students respectively. Case study three was conducted in a neighborhood primary school (Pri C) and it involved six Primary 5 (11-years-old) students. The three participating schools were typical Singapore schools in which English is the medium of instruction.

To explore how language abilities influence the students' use of ICT for Chinese composition writing and their perception about it, maximum variation was adopted as the sampling strategy. Based on the students' Chinese language performances obtain from school records, the teachers were requested to select two students each from the high, medium, and low academic abilities in Chinese. Table 1 presents the demographic information of the participants by assigned pseudonyms.

Table 1: General Information of the Target Students

Secondary School A (Sec A)		Secondary School B (Sec B)		Primary School C (Pri C)	
Pseudonyms (gender)	Chinese Composition Standard	Pseudonyms (All Male)	Chinese Composition Standard	Pseudonyms (gender)	Chinese Composition Standard
Liewu-A (M)	Low	Longzhi-B	Low	Lisha-C (F)	Low
Luowen-A (M)	Low	Lingchuan-B	Low	Lianqing-C (M)	Low
Minyu-A (F)	Medium	Laide-B	Low	Minghui-C (F)	Medium
Meiqing-A (F)	Medium	Lida-B	Low	Mucheng-C (M)	Medium
Hanjia-A (F)	High	Mengjie-B	Medium	Huiyi-C (F)	High
Haiyin-A (F)	High	Minzhong-B	Medium	Hanyun-C (F)	High

The conduct of the case studies

Two hours of training on using the selected Chinese input tools was conducted prior to the study. Table 2 lists the software tools that the research team recommended the students to use for writing Chinese compositions during the observed activities. The emphasis was on researching into how the students perceived ICT-based writing and the challenges they faced. To this end, a variety of tools or input methods were provided for the students to mix and match. They were free to switch to any of the provided tools or input methods based on their needs.

For Microsoft Pinyin IME, in particular, the target students were trained in three input modes, namely, single character input (inputting character by character, and manually performing candidate selection due to homophones), *pinyin character group* (拼音词组, similar to single character input except that the user inputs pinyin by phrase[1] (词)), and *full sentence input* (全句输入, inputting the pinyin of all the characters in a full sentence and let the computer perform real-time, automatic, supposedly context-sensitive candidate selection). The *full sentence input* is supposedly the most efficient input method among the three, except that the user might need to go back to edit the automatically generated sentences because of the software's occasional wrong selections of single characters or phrases (due to homophones). After the training, three composition activities per school were conducted. The topics of the compositions in the secondary schools were all argumentative. The primary school students were assigned narrative compositions, two topical and one pictorial.

Table 2: Software tools used during the empirical activities

Category	Name	Functionalities related to compositions
Word processor	Microsoft Word	General word processing
Chinese character input	PenPlus (一笔通)	❑ Handwriting input along with the bundled tablet (writing pad) ❑ *Pinyin*-based[2] (phonetic) input with bundled Chinese Plus 一件通 (software)
	Microsoft Global Input Method Editors (IME)	❑ Microsoft Pinyin IME for *Pinyin*-based input ❑ Microsoft IME pad for handwriting input along with the PenPlus tablet
Reference	PowerWord 金山词霸	Chinese-English two-way e-dictionary

Data Collection and Analysis

Results from multiple data sources were triangulated to search for regularities in the data (Goard & Symonds, 2010; Guba & Lincoln, 1989). Data were collected from one-to-one interviews, focus group interviews, and observational field notes. Interviews were conducted at the beginning and the end of the study to investigate the participants' perceptions in ICT-mediated Chinese writing. Focus groups were also facilitated after each writing session. In addition, the researchers installed and launched MORAE, a software application that uses a webcam and a microphone attached to the computer to capture video of the participants' on-screen activities, together with their facial expressions and speech when they were using the computers to write their composition.

On-going data analysis was performed during the study. The researchers started with coding the activity data captured by MORAE and the field notes to identify emerging themes: perceptions on using the ICT tools and the experience of using the ICT tools. Themes were cross-classified to look for patterns between them, and evaluated them based on continued re-examining of the existing data (Bogdan & Biklen, 1998). MORAE recordings were used to verify the existing data and added new themes when necessary. The researchers also wrote a profile for each participant at the final stage of their data analysis and invited the students to "member-check" the accuracy of the account. By the end of the empirical activities, a summative analysis was performed to compile the findings. Due to the adopted research methodology, the findings were not intended to be generalized to a larger population. However, from the study, the researchers had uncovered issues that are critical to the training of students in inputting Chinese via computers.

MAJOR FINDINGS

Guided by the above-mentioned research questions, the researchers organized their major findings into three sections, namely, (1) Students' perceptions of writing Chinese compositions; (2) Students' perceptions of using the ICT tools for writing Chinese compositions; (3) Preferences for using the selected ICT tools for writing Chinese compositions. Three assertions were formulated to summarize the findings.

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1 In the context of Chinese Language, "phrase" is known as "word" in some literature. It is important to distinguish phrase/word from "character" (字). One phrase/word consists of two or more characters.

2 "Pinyin" (or "Hanyu Pinyin") is the most common standard Mandarin romanization system in use. The phonetic-based scheme has become the basis of one of the most popular and easiest-to-learn Chinese computer input methods.

Assertion 1: The interview data revealed that the participants' perceptions of Chinese composition writing seem to be fragmented and inconsistent. The secondary school students' views could be categorized as (1) being exam-oriented; (2) wishing to be trained in the language and the Chinese way of thinking; and (3) for expressing oneself and communicating with others. The primary school students were unable to articulate their views but their frequent counting of words during composition writing shows that they were being exam-oriented. Overall, most of them are not motivated to learn Chinese and write in Chinese.

The interview records indicated that the secondary school students had different views about the why they had to learn to write compositions in Chinese. Their views could be categorized in three groups, namely, (1) Being exam-oriented; (2) Wishing to be trained in the language and thinking; (3) Using writing to express and communicate.

For those who fell into group (1), Luowen-A, Liewu-A and Minzhong-A were noticeably passive. Luowen-A's articulation captured the essence of their attitude towards writing Chinese composition, "*I write Chinese composition for the sake of exams. Actually, I am not interested in writing composition." (Sep 22, 2006)* This illustrated both his and his peers' contradictory attitude towards Chinese writing: intellectually, they recognized the need to practise Chinese writing but affectively, they disliked doing so. At the post-interview, Luowen-A was frank in talking about his view on writing in Chinese, *"If it is not for the exams, I do not need to write in Chinese in my daily life at all. It is enough to be able to speak Mandarin." (Apr 18, 2007)*

Meiqing-A from group 1 offered a slightly more positive view. She held the same view throughout the pre- and post-interviews: *"I wish to receive good results* [in Chinese]. *I can feel a sense of achievement." (Sep 22, 2006 & Apr 18, 2007)* She felt that exams give her the momentum to write.

Participants belonging to group (2) were Minyu-A, Laide-B, Lida-B, Longzhi-B and Lingchuan-B. Minyu-A claimed in the pre-interview, *"I could learn to write stories in Chinese, which would train me to write creatively." (Sep 22, 2006)* In the post-interview, she said, *"Compositions would train me to contemplate on specific topics." (Apr 18, 2007)* Laide-B said in the pre-interview, *"I am better in speaking Mandarin but weak in writing Chinese. Training to write compositions is important to me." (Sep 22, 2006)* Lida-B stated in the pre-interview, *"Learning to write could improve my language skills, so that I could write letters or emails in Chinese in future." (Sep 22, 2006)* After the intervention, his perspective slanted towards learning to write in order to take the Secondary 4 National "O" Level Examination. Longzhi-B told the researchers during the pre-interview, *"Writing develops our creativity."* Conversely, Lingchuan-B reflected during the pre-interview *(Sep 22, 2006)* that he wrote because the teacher wanted him to, and changed his mind about writing after the intervention to *"writing Chinese can probably help me in speaking Mandarin." (Apr 18, 2007)* These five students were not consistent in their perceptions before and after the study. This could be because they had not put much thought into this issue in both the pre- and post-interviews but just gave the researchers quick replies with whatever came into their mind.

The third group of students viewed writing Chinese composition as a form of self-expression and communication. Hanjia-A, Haiyin-A and Mengjie-B belonged to this group. Their views during pre-interview were consistent with those of the post-interview. Mengjie-B's view was profound, *"If a reader encounters an article which she can fully empathize how the author think and feel, she will know she is not alone in her thinking. It is likened to searching for friends via the compositions." (Apr 18, 2007)*

It was even harder to get Pri C participants to articulate their perceptions in learning Chinese and Chinese compositions. They either liked or disliked Chinese; but they just did not manage to give reasons. Instead, most of them just quipped, *"I don't know." (Mar 3, 2006)* The only exception was Huiyi-C who said during the pre-interview, *"I like writing Chinese compositions because I can learn more knowledge and idioms." (Mar 3, 2006)* While the researchers were unable to obtain articulation among the primary students, it seems clear to them that the primary school participants showed an unwillingness to write in Chinese by either heaving a deep sigh or complaining that they had to write *another* composition at the beginning of each session.

Conversely, the observation data showed that the majority of the Pri C participants tended to write Chinese composition for the sake of passing exams rather than for communication. They considered fulfilling the word count requirement (100 words for Primary 5; compared to 350 words for Secondary 3) as their priority in writing a Chinese composition. For example, when being asked, *"What do you care the most when you write a Chinese composition?"* All the participants except Huiyi-C quipped, *"Counting the number of characters." (Mar 3, 2006)* Moreover, according to our MORAE recordings, they did count the number of characters from time to time when they were writing their compositions, especially towards the end. When they reached the 100-character requirement, they would just wrap up their compositions. They were not interested in revising or proofreading their work.

The secondary students who were weak in Chinese were also exhibiting the above-mentioned behavior when they were writing the composition. This included Luowen-A, Lingchuan-B, Laide-B and Longzhi-B. Most other secondary school students could keep writing and before they knew it, they had exceeded the word count by a great deal. The reason could be, from the analysis of the MORAE recordings, that the secondary school students were more familiar with inputting Chinese on the computer, more mature in their thinking, and had better language skills. The weaker students were more concerned about the word count. They considered they had done their work as long as they could come up with the necessary number of words.

Nevertheless, due to the difficulties in learning Chinese, mainly in learning to write logographic characters, the students preferred to write in English while communicating socially in Mandarin after school. An exception to this was Sec B which was a traditional English school where students rarely use Chinese or speak Mandarin.

In short, the participants had various personal goals in learning Chinese compositions. Many students were not motivated to practice Chinese compositions as there is no perceived need by most of them to write Chinese in their daily lives.

Assertion 2: The participants had different perceptions of using ICT tools for Chinese compositions. Their perceptions were in general related to the technical competency level (pertaining to the input system) in their writing process and greatly influenced by their experiences in using the tools. They were in general enthusiastic to try out ICT-based writing in the beginning. However, those who could not cope with the linguistic and technical challenges of Chinese input gradually became frustrated by the end of the study.

Typing Chinese texts on computer has been perceived by many "Chinese input savvy" adults as an easier means of writing than writing with paper and pen (Xie, 2004). However, it was observed that the participating students did not make the fullest use of the technologies. The interview and observation data revealed that their perceptions of using ICT tools varied from session to session. For many of them, their perceptions at the end of the writing sessions could be the complete opposite of what they thought before they started using the tools. Such a change was more pronounced in primary school pupils as compared to secondary school students.

Secondary school: Pro-computer input students' perceptions

The secondary school students had great expectations before they engaged in the study. Most of them have had experience with Chinese input systems. However, not all of them had the experience of writing a complete composition on computer. They therefore assumed that inputting pinyin and letting the computer retrieve the Chinese characters would solve their problem of not being able to recall the logography of how to write the characters. It will speed up their writing. Those who had such expectations are Hanjia-A, Minyu-A, Minzhong-B, Laide-B and Lida-B.

Among them, Hanjia-A reported that she wrote faster on the computer than with pen and paper. In addition, she perceived that writing on the computer helped in her composition. She reported that she learned new words from the candidate window, which contains homophones for the user to select the intended character. When selecting the intended character, she could see many other homophones. She learned those characters and made use of them during the class composition (using pen and paper) lessons. This contradicted one of the teachers' concerns: with computer input, the students would forget about how to handwrite Chinese characters (e.g., Qi, 2003; Gao, 2006; Xiong, 2007). The researchers related her perception with her academic results and found that she was good in Chinese in her class. That is probably why she could obtain unexpected learning gains from the input method. In the United States, Xie (2001) conducted a study in ICT-mediated Chinese writing on non-Chinese college students who studied the language and reached a similar conclusion that they learned more Chinese characters through frequent use of pinyin input.

Other pro-computer input students voiced other reasons for their preference, for example, while Haiyin-A said it was strenuous to write with pen and paper, Luowen-A, apart from appreciating the convenient access to the e-dictionary, wished that the future generation of e-dictionary could interpret the writer's writing and recommend related idioms and figurative expressions – he admitted that such an aspiration or a desire had increased his willingness to try out ICT-based compositions.

Secondary school: Anti-computer input students' perceptions

In contrast, Meiqing-A liked to write with pen and paper as she could practice handwriting. She believed that handwriting with pen and paper would show one's sincerity. Lingchuan-B, Mengjie-B and Liewu-A held a similar opinion. In particular, Lingchuan-B thought that it was very inconvenient to write with the writing pad. Mengjie-B further remarked that he preferred pen and paper because his hand was linked to his brain.

Longzhi-B was the only student that had the same perception of ICT input as most of the primary school pupils (see below). Before the writing sessions, his had favorable perception of ICT-based input, *"It is faster to use computer input. It is inconvenient to use pen and paper." (Sep 22, 2006)* However, at the post-interview, he said, *"It is easier to do editing with pen and paper. I found pinyin input troublesome and indirect; and the computer kept recognizing my handwriting incorrectly when I used the writing pad. I was only able to pick up some speed when I wrote my composition written during the 3rd session." (Apr 18, 2007)* Word processors had often been touted as more efficient in editing as compared to pen and paper (e.g., Graham, 2008; Khalid, Swift, & Cullingford, 2002; Russell, Bebell, Higgins, 2004), but Longzhi-B thought otherwise. It could be due to his relatively weak pinyin and transcription skills.

Primary school students' perceptions

The six primary school pupils had similar perceptions and exhibited similar changes in opinions towards computer-based input. At the beginning, they were excited about using ICT-based Chinese compositions and unanimously indicated a preference for using the ICT tools. During the focus group discussion after the training session, all of them expressed their enthusiasm and preference for using the ICT tools to pen-and-paper, *"It is fun to write on a computer. I can use Pinyin to find Chinese characters. It is very interesting. It is a time saver because I don't need to write stroke by stroke."* (Huiyi-C, *Mar 7, 2006*) *"It is much easier to make correction when writing on computer."* (Hanyun-C, *Mar 7, 2006*)

Their reaction toward using ICT tools differed greatly after the first writing session. Only half of them remained excited about using the ICT tools to write Chinese composition. While Lianqing-C and Liya said respectively, *"Using computers makes Chinese composition writing much easier, because I can use the e-dictionary.", "I want to use computers to write Chinese composition, because I can use the e-dictionary." (Apr 13, 2006),* others changed from excitement to frustration after they encountered a variety of linguistic and technical difficulties, including repeated misrecognition of their handwriting. For example, Hanyun-C said, *"I felt a little bit nervous, because I haven't used computers for a long time." (Apr 13, 2006)* Minghui-C shared her frustration by saying, *"When I wanted to write a character, the computer showed a strange character. I had to write that character again, and a wrong character showed up. I had to delete them one by them. Then I forgot what my next sentence was." (Apr 13, 2006)* Huiyi-C, who encountered the same problem more frequently, voiced out her fear, *"I'll definitely fail the examination if I use a computer to write my composition." (Apr 13, 2006)* During the post-interview, she said, *"I prefer to write Chinese compositions with pen and paper to on a computer." (May 25, 2006)* Her preference has a close connection with the ICT tools she chose to use, which will be elaborated in the following section.

In short, whereas many of the participants indicated their preference in writing Chinese compositions with ICT tools, more than half of them gradually changed from excitement to frustration over the three composition sessions; The novelty effect at work. Linguistic and technical difficulties surfaced. They had found themselves struggling with the technical challenges before they could even start to enjoy the perceived benefits of the new writing medium. Such change seemed to be more pronounced among primary school pupils as compared to secondary school students. Primary students had higher initial excitement. Yet, because of their lower technical competency level and weaker language skills, the challenges they experienced were relatively greater than their older peers and their excitement diminished.

Assertion 3: Due to the complex process of writing Chinese on computer, the participants found it difficult to learn all input skills simultaneously within a short period. As a result, they selectively used those tools that are similar to writing with pen and paper or with what they were most familiar with. In other words, they each have their preference for a unique combination of tools.

All the participants mentioned that writing Chinese characters was the most difficult part of writing with paper and pen. They were frequently stuck in transcription, as they did not know how to write certain characters. Therefore, most of them preferred to speak Mandarin, and read and write in English. Could writing Chinese on computer affect this preference?

There is a great difference between typing English and Chinese on a computer. When one types English texts, one uses the keyboard to type what one wants to compose. Inputting Chinese characters may require one to choose from various input methods, that is, it involves decision-making. Due to the complex process of writing Chinese on a computer, the participants found it difficult to learn all input skills simultaneously. As a result, some participants selectively used those tools that are similar to writing with pen and paper or with what they were most familiar with, such as using the phonetic (pinyin) input method. Others challenged themselves to use a combination of tools to solve the difficulties they encountered. Table 3 depicts the students' choices of using the input methods during the writing sessions as compiled from the coded MORAE recordings.

Pinyin versus handwriting input
Based on the researchers' analysis, secondary school participants overwhelmingly used pinyin input (see Table 3). It was because they were relatively skilled in the pinyin scheme. They were selecting the input method most familiar to them. For inexperienced primary school users, handwriting on the writing pad seemed most intuitive. According to their Chinese teacher, although Pri C pupils were taught pinyin in Primary 1, they rarely used it after Primary 3 and were therefore unable to recall much.

Secondary school students: Challenges faced in using pinyin input
Although secondary school students overwhelmingly employed the pinyin input method, some of them also used handwriting input when they could not find the characters they needed via the pinyin input. The pinyin mistakes they made tended to be mixing up the pronunciations of "zh" and "z", "ch" and "c", "d" and "t", "b" and "p", "s" and "x", "n" and "ng", etc., and Singapore-accented pronunciations (which shows strong influence of various southern Chinese dialects). Occasional users of the handwriting input device faced another challenge. They usually had to write the character repeatedly before the software was able to recognize it (or, in some cases, unable to recognize it at all). This could be due to the incorrect stroke order.

Table 3 Students' Choices of Using the Input Methods [PY = pinyin / HW = handwriting]

		1st writing session		2nd writing session		3rd writing session	
		Mainly used	Occasionally used	Mainly used	Occasionally used	Mainly used	Occasionally used
Sec A	Liewu-A	PY	HW	(absent)		PY	-
	Luowen-A	PY / HW		PY / HW	-	PY / HW	-
	Minyu-A	PY	-	PY	-	PY	-
	Meiqing-A	PY	HW	(absent)		PY / HW	-
	Hanjia-A	PY	-	PY	-	PY	-
	Haiyin-A	PY	HW	PY	HW	PY	-
Sec B	Longzhi-B	PY / HW	-	PY	HW	PY / HW	-
	Lingchuan-	PY	-	PY	-	PY	-
	Laide-B	PY	HW	PY	HW	(absent)	
	Lida-B	PY	-	PY	-	(absent)	
	Mengjie-B	PY	HW	PY	HW	(absent)	
	Minzhong-B	PY	HW	PY / HW	-	PY	-
Pri C	Lisha-C	PY / HW	-	PY	ED	HW	-
	Lianqing-C	HW	PY	HW	PY	PY	-
	Minghui-C	HW		PY	HW	PY	-
	Mucheng-C	HW	PY	PY	-	HW	PY
	Huiyi-C	HW	-	HW	-	HW	-
	Hanyun-C	HW	-	PY	-	PY	-

Secondary school students: Challenges faced in using "full sentence input" method
Conversely, many of the participants employed "pinyin character group" (input by phrase). Few of them employed the IME "full sentence input method". However, the computer system will usually make mistakes in selecting individual characters or phrases within a sentence, either because it being homophones with other phrases, or due to the student entering the incorrect pinyin. The students were therefore forced to work backward in their writing to make the change. It slowed them down and disrupted their train of thoughts. As a result, some participants such as Haiyin-A, Laide-B, and Longzhi-B who had chosen the *full sentence input* method during their first writing session gradually reduced or stopped using it.

In Laide-B's case, as he was very weak in pinyin, he experienced the greatest difficulty in "full sentence input" as compared to Haiyin-A and Longzhi-B. When he inputted the entire sentence, he discovered that it had many mistakes due to his mis-pronunciations. This frustrated him a great deal. In Haiyin-A's case, she was reminded by the researchers during the first writing session to make use of *full sentence input*. She was able to improve her speed while writing the composition during that session. However, when she came back to write her second composition three weeks later, she seemed to have forgotten this function. She reverted back to the slow way of inputting by character or phrase.

In contrast, Hanjia-A, Minyu-A, Mengjie-B, and Lingchuan-B who were relatively good in pinyin and keen on exploring new software features were more and more proficient in "full sentence input". As such, they almost stopped using the handwriting pad. However, they would once in awhile overlook the incorrect selections by the computer.

Secondary school students: Frequent switches between input methods

Luowen-A was the only secondary school participant who frequently switched between pinyin and handwriting input methods. He was weak in both pinyin and handwriting. He used mainly pinyin input at the first and second writing sessions, and the first half of the third writing session. However, because his peer who was sitting next to him became impatient with his frequent inquires, he switched to using handwriting input at the latter part of the session. He faced great challenge in handwriting input as he could not write proper Chinese characters.

Primary school students: Challenges faced in employing handwriting input

Some pupils in Pri C adhered to handwriting input throughout the sessions. Others switched from handwriting input to using a combination of ICT tools to solve the problems they encountered.

Even with the same tool, the pupils varied in terms of the input speed and methods. For example, Hanyun-C preferred to use the tablet to handwrite each character. Using the same tool, Huiyi-C could input two or three characters at a time. Minghui-C became quite proficient in the handwriting input method by the third session and set the record of writing seven characters in one shot. On the other hand, she was weak in pinyin and preferred to just input the beginning sound of a character (that is, the first one or two Latin characters of the *pinyin*) and then scroll the candidate window to look for the character. Often, she missed the character because there were too many characters in the window than she could handle.

Both frequent and occasional users of the handwriting input found that the reliance on the writing pad and character recognition software for inputting characters was not as intuitive as pen and paper handwriting. For example, although Huiyi-C was the only pupil who used handwriting input throughout, in one occasion, she had to write the character "友" nine times to get it correct – it was misrecognized as 支、歹、交 before the computer finally recognized the character she wrote as 友. She said in her final interview that handwriting input with a tablet was more troublesome than writing with paper and pen.

Primary school students: Challenges faced in employing pinyin input

Although the pinyin input method could solve the character recognition problems, the majority of the participants were weak in pronunciation and therefore weak in pinyin. They therefore would only use it as a quick fix and then switched back to handwriting input. There are two possible explanations for their preference. First, as they reported in their pre-interviews, they lacked confidence in using pinyin as they rarely used it after Primary 3. Second, because they were trained first in handwriting input and second in the pinyin input during the training session they felt more comfortable with the former.

Primary school students: Frequent switches between input methods

Some of the participants chose to alternate between the handwriting and pinyin input methods due to their weak transcribing skills. For example, Mucheng-C's handwriting in Chinese is not good enough to be easily recognized. Furthermore, he is left-handed. He frequently encountered the problems of wrong handwriting recognition due to the positioning of the pad and the poise of his hand in holding the pen. He also wrote with wrong stroke sequence which contributed to the handwriting input difficulty. The challenges he faced distracted him a great deal. For example, when he wrote the phrase "开心" (happy), the characters could not be recognized by the handwriting software, even after five tries. This was similar to Huiyi-C's above-mentioned experience of trying to input "友". However, unlike Huiyi-C who stuck to handwriting input until the software got it right, Mucheng-C opted to switch to *pinyin* input. Unfortunately, he keyed in the erroneous phonetic symbols (*pinyin*) for 心, "sin" (the correct *pinyin* should be "xin"). As a result, he wasted a lot of time switching between the input methods and yet his problem was still unresolved (see the screenshots in Figure 1a-1l). During the last 15 minutes of the session, he was worn out and lost concentration, causing more recognition errors.

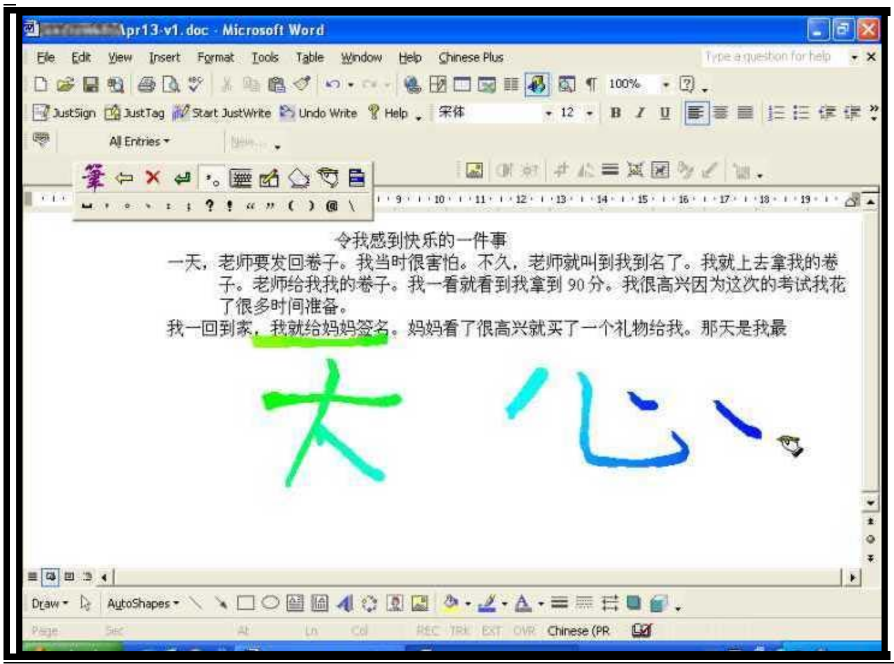

Figure 1a: Mucheng-C's first attempt to handwrite 开心

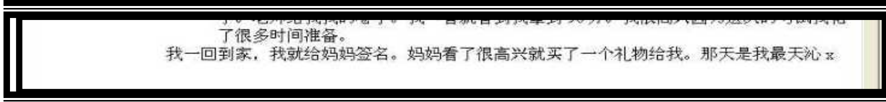

Figure 1b: 心 is mis-recognized as another character 么

Figure 1c: Second attempt to handwrite 开心

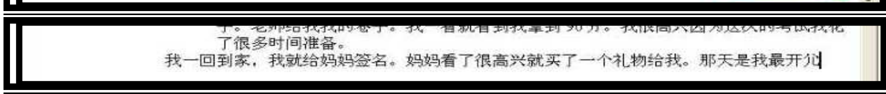

Figure 1d: Misrecognized as 开允

Figure 1e: Deleted 允 but kept 开, then attempted to write 心

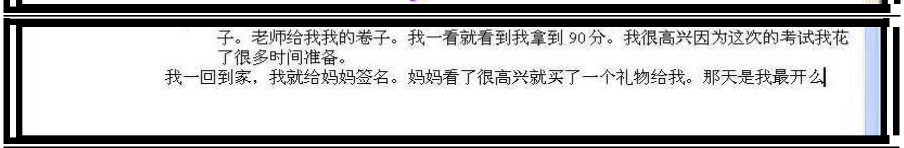

Figure 1f: Misrecognized as 么

Figure 1g: Attempted to write 心 again

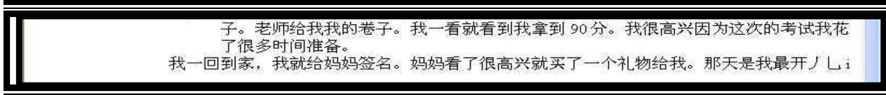

Figure 1h: Mis-recognized as two separate character strokes and an alphabet “i”

Figure 1i: Attempted to write 心 yet again

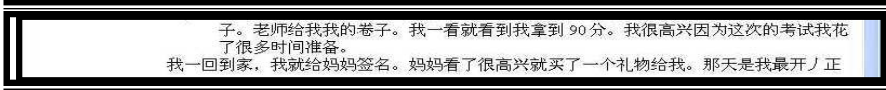

Figure 1j: Mis-recognized as a character stroke 丿 and another character 正

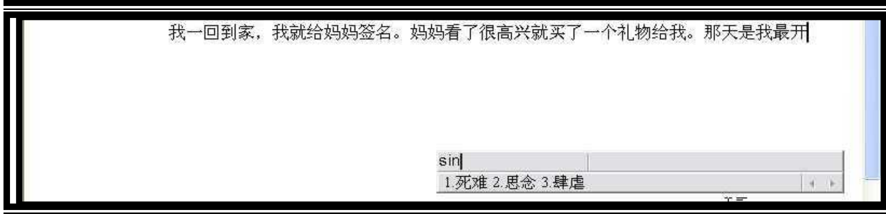

Figure 1k: Switched to pinyin input but keyed in the wrong pinyin of 心 as “sin” (should be “xin”) and therefore could not find the character from the candidate list.

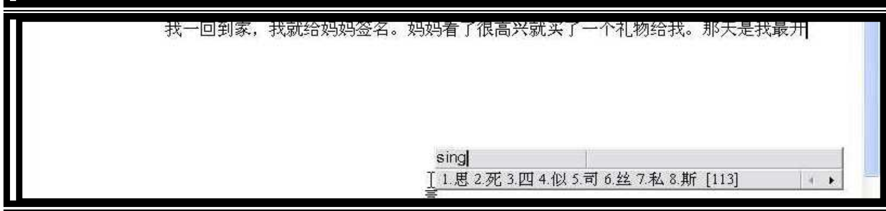

Figure 1l: Tried “sing” instead but still could not find the character from the list. (Eventually, he asked a researcher for the correct pinyin.)

E-dictionary

Albeit being a reference tool, the e-dictionary did play a role in some of the target students’ transcribing process. When a student encountered a character that he could only recall the pronunciation but not the shape, she could either just input the *pinyin* and search for the character from the candidate window, or search for it with the e-dictionary by *pinyin* or by English-to-Chinese and then cut and paste the character from the e-dictionary window to the word processor.

Based on our MORAE video analysis, while students from Sec B frequently looked meanings up the e-dictionary, students from Sec A almost never used it. Sec A students would consult their peers *about* pinyin, translations, and how to write certain characters. Meiqing-A, Minyu-A and Hanjia-A all thought that the user interface of the e-dictionary was complicated. They had to go through a few steps to find the characters. Only Liewu-A thought that using the e-dictionary was easier than using a print dictionary.

Sec B’s students who studied in a typical English school depended a lot on the e-dictionary and seldom asked for help from their peers. Except for Lida-B, they frequently made use of the e-dictionary to look up translated terms. They conceded that they had seldom consulted their peers even in the actual composition classes to avoid disrupting one another’s train of thought. However, the real reason could be that they thought that their peers’ standards of Chinese were not high enough, as what Longzhi-B said during the post-interview, *“I only consult those whose Chinese are better than me.” (Apr 18, 2007)* They reported that the e-dictionary had provided substantial help to them.

The behaviors of Pri C participants in looking up the e-dictionary were similar to Sec A participants—most of them find it too troublesome to check either the e- or printed dictionary. Whenever they did not know how to write a Chinese character, they would asked their teacher for help as that is *“the quickest resort”* (Huiyi-C, *13 April 2006*). In addition, Pri C participants were not familiar with *pinyin*. Some of them did not know how to deal with two windows on the computer either.

In summary, the participants' choices of using the ICT tools had some connection with the linguistic and technical challenges they encountered. Some participants reacted actively by choosing an appropriate ICT tool or a combination of the tools to overcome their difficulties. Others reacted passively as they were overwhelmed by the difficulties they encountered.

DISCUSSIONS AND FUTURE DIRECTIONS

The reported study started off with the major focus on how Singapore students perceived ICT-mediated Chinese compositions and how they made use of the ICT tools to accomplish the stated task. Through the analysis of the collected data, it was discovered that the students' competency level in using the ICT tools, particularly in Chinese computer input devices, is a potential hurdle that will significantly undermine the potential benefits of ICT-mediated writing. Although the issue of students' difficulties in Chinese input has been discussed in prior literature (e.g., Ding, 2002; Du & Crestani, 2005; He, 2003), little or no in-depth, academic-oriented, school-based study has been reported.

Many participants, especially the primary school students, were not able to overcome the hurdle of inputting Chinese using the *pinyin* method. The reasons were two-fold: they had low retention rate in the pinyin scheme and they were affected by the Singapore-accented Chinese. Since most of the students in our study encountered a *three-level* translation/transcription hurdle, that is, translating from English to Chinese, from Chinese to *pinyin* and then to keyboard strokes, Singaporean Chinese language teachers should be made aware of this issue. They should consider helping their students overcome the *pinyin* issue before starting ICT composition writing. This three-level translation process is more complicated than the reported double translation process (Wolfe & Manalo, 2004) experienced by L2 learners of European languages. Based on the findings of this study, the research derived the following breakdown of such a complex process (adapted from Xie, 2001):

a. Transforming ideas into words and syntactic structures in mind
b. Recalling the pronunciations of individual characters
c. Mapping the pronunciations into *pinyin*
d. Mapping the *pinyin* representations into keyboard strokes
e. Identifying the right characters from the candidate window
f. Selecting the right characters

The process breakdown confirmed Wolfe & Manalo's (2004) argument that writing with keyboard, an indirect, unnatural written communication process, is more tedious for students with less computer experience. As such, the students may devote too much effort in this aspect and neglect the other higher level writing processes such as planning and revising (Graham, 1990; McCutchen, 1988). This problem is not unique to Singapore students or any student studying Chinese as L2, as a considerable number of learners in China may be facing similar problems due to the interference of dialects (e.g., Du & Crestani, 2005; Duan, 2004; Wang, 2006) or improper design of the curriculum for primary schools (e.g., Ding, 2002). In the foreseeable future, inputting Chinese characters into the computer will remain as a challenge for young learners to carry out e-writing in Chinese.

Therefore, it is necessary to design new pedagogy for learning these tools so that the students can benefit from the technologies, not be hampered by them (Peckham, 1996; Vician & Brown, 2000; Chinnery, 2006). There should also be ample opportunities for the students to practice using the software, the input methods, and training in *pinyin*, as there is often a gap between "having learned the skill" and "making good use of it". Their aim is not only to help the students to pick up, but internalize these skills.

On the other hand, the researchers argued that the training of *pinyin* input should not wait till higher primary school or even secondary school when the pupils are about to write compositions with ICT tools. *Pinyin* training needs to be commenced lower primary school, and incorporate Chinese ICT-based learning into the *pinyin*, speech, and reading curriculum. The Chinese curriculum should include ICT-based activities for assignments such as sentence writing. With such training, the students will be as skilled as they are using English ICT tools when they start Chinese ICT-mediated writing.

Another issue that arose from the study was the designs of the tools. The researchers argued that most of the popular software products in the market (e.g., Microsoft Word, Microsoft IME, PenPlus and PowerWord) have been designed mainly for adult uses (user-interface, software features, Chinese input methods, etc.). It is important to guide the students in selecting the right applications, simplify the user-interface (for example, remove the unneeded menu bars in the Word interface), and to provide them with sufficient training and long-term support.

The researchers' experience in looking for collaborating schools in the early stage of this study shows that a scaling-up of ICT-mediated Chinese writing in Singapore schools may still be hampered by the examination-oriented mindset of the school leaders and teachers in general (Looi, Hung, Chen & Wong, 2006; Tan, 2006). As the Chinese composition papers of the national examinations is still paper-and-pen-based, the educators were likely to raise their concern on the students' ability to revert back to the paper-and-pen writing mode during the examinations if their teachers adopt ICT-mediated writing pedagogy extensively. A positive development is, as stated in the Introduction section of this paper, is that the MOE has been considering the introduction of ICT-based compositions in the national examinations – though it may take a long time for such major change to happen.

The researchers would like to acknowledge two major limitations of this study. First, they had only selected eighteen participants from three schools for the study as we have opted for an ethnographic and qualitative study approach. Despite of the small sample size which cannot grant for generalization of the findings, the researchers argued that some significant trends emerged from the data would offer teachers a good picture of salient challenges that they should take note in nurturing students' Chinese input skills.

Second, because of the time constraint, they had only conducted three empirical sessions of ICT-mediated Chinese compositions for the participants. The primary school participants were overwhelmed by learning so many things in a short period. In addition, the participants did not practice Chinese input at home.

Based on the research findings, they had formulated a long term plan which: a) incorporates teacher professional development and input method pedagogical design; b) develop a student-oriented Chinese writing platform.

As the researchers were also involved in teacher education, they started a teacher professional development project in February, 2007. Curriculum design was one of the goals of the research project. However, they did not adopt the traditional instructor-centered approach. Instead, they conducted a Collaborative Inquiry, an approach that promotes the collaboration between researchers and practitioners to advance both knowledge and action (Darling-Hammond, 1996). They invited 14 Chinese Language teachers from 12 schools, and two MOE officials to participate in the project. They intended to research into designing and developing an ICT-based Chinese writing curriculum. Their goal was that the curriculum must not only ensure that the needs of the students are met, it should also be integrated to the existing curriculum. Therefore, it was crucial to involve in-service teachers and MOE officials in the design process.

After they had developed the pedagogy, conducted trials and successive refinements, they would be able to identify the parts of the learning process and scaffolding that can be automated. They would then work with software developers to develop writing software. The aim of the software was to lighten the workload of the teacher during students' writing activities and allow the students to practice Chinese writing during their free time. From the Chinese input stand point, they hoped to design a seamless environment for switching between handwriting and pinyin input methods. This would enable the students to select the appropriate input method as and when needed. With such a platform, many more schools would be likely to promote Chinese writing activities.

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REFERENCES

Berninger, V. & Winn, W. (2005). Implications of Advancements in Brain Research and Technology for Writing Development, Writing Instruction, and Educational Evolution. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of Writing Research* (pp. 96-114). New York: The Guilford Press.

Bloch, J. (2004). Second language cyber rhetoric: A study of Chinese L2 writers in an online usenet group. *Language Learning & Technology*, *8*(3), 66-82.

Bogdan, R. C., & Biklen, S. K. (1998). *Qualitative research for education: An introduction to theory and methods* (3rd ed.). Needham Heights, MA: Viacom.

Bourgerie, D. S. (2003). Computer assisted language learning for Chinese: A survey and annotated bibliography, *Chinese Language Teachers Association*, *38*(2), 26-47.

Chang, R., & Chang, M. S. (1978). *Speaking of Chinese*. New York: W.W. Norton.

Chinnery, G. (2006). Going to the MALL: Mobile assisted language learning, *Language Learning & Technology*, *10*(1), 9-16.
Crook, C., & Bennett, L. (2007). Does using a computer disturb the organization of children's writing?. *British Journal of Developmental Psychology*, *25*(2), 313-321.
Darling-Hammond, L. (1996). The quiet revolution: Rethinking teacher development. *Educational Leadership*, 53(6), 4-10.
DeFrancis, J. (1984). *The Chinese Language: Fact and Fantasy*. Honolulu: University of Hawaii press.
Ding (2002). Issues in applying "proper word method" for language teaching materials, *Minjiang College*, *23*(1), 56-63. (In Chinese)
Du, H., & Crestani, F. (2005). Spoken versus written queries for mobile information access: An experiment on Mandarin Chinese. In K. Y. Yu, J. Tsuji, J. H. Lee, & O. Y. Kwong (Eds.), *Lecture Notes in Computer Science: Natural Language Processing IJCNLP 2004* (pp. 745-754). Heidelberg, Germany: Springer.
Duan, X. (2004). An investigation and analysis of the present middle school language norms. *Journal of Hangzhou Teacher Training College: Social Science Edition*, *5*, 102-106. (In Chinese)
Erickson, B. J. (1992). A synthesis of studies on computer-supported composition, revision, and quality. *Research on Computing in Education*, *25*(2), 172-188.
Fan, L., Tong, L., & Song, J. (1987). The characteristics of Chinese language and children's learning to read and write, In D. A. Wagner (Ed.), *The Future of Literacy in a Changing World* (pp. 87-94). New York: Pergamon.
Fu, P. (2005). *Student approaches to learning Chinese vocabulary.* Unpublished doctoral dissertation, Virginia, USA: Virginia Polytechnic Institute and State University.
Gao, X. (2006). Can you still write today?. *Home Technology, 7*, 43. (In Chinese)
Goard, S., & Symonds, J. (2010). Death of mixed methods?: Or the rebirth of research as a craft. *Evaluation and Research in Education, 236*(2), 121-136.
Graham, S. (1990). The role of production factors in learning disabled students' compositions. *Educational Psychology*, *82,* 781-791.
Graham, S. (2006). Writing. In P. A. Alexander, & P. H. Winne (Eds.), *Handbook of Educational Psychology* (2nd ed.). (pp. 457-478). Mahwah, NJ: Lawrence Erlbaum.
Graham, S. (2008). The power of word processing for the student writer. Retrieved from: http://doc.renlearn.com/KMNet/R004215628GH546B.pdf
He, N. (2003). The family education of Wang Yongmin, "the Father of Wubi". *Parents Monthly*, *3*, 6-8.
Ho, C. S. H., Ng. T. T., & Ng., W. K. (2003). A 'radical' approach to reading development in Chinese: The role of semantic radicals and phonetic radicals. *Literacy Research*, *35*(3), 849-878.
Kang, H. (2011). Computer-based writing and paper-based writing: A study of beginning-level and intermediate-level Chinese learners' writing. *Ph.D. Dissertation*. Columbus, USA: The Ohio State University.
Ke, C., Wen, X., & Kotenbeutel, C. (2001). Report on the 2000 CLTA articulation project, *Chinese Language Teachers Association, 36*(3), 25-60.
Khalid, H., Swift, H., & Cullingford, C. (2002). The new office technology and its effects on secretaries and managers. *Education and Information Technologies, 7*(3), 1360-2357.
Liang, R. J. (1999). *Language Teaching, Learning and Assessment*. Singapore: Raffles.
Liang, R. J. (2000). The relationship between Singapore students' Chinese vocabulary and reading ability with their attitudes and Chinese learning achievement. In H. G. Zhang (Ed.), *New trends in teaching Chinese* (pp. 38-52). Hong Kong: ILEC.
Lim, S. (1997). Thinking, computers and Chinese teaching and learning. In: Chua, C. L. (Ed.), *Creativity and Information Technology*, 110-121, Singapore: SNP Edition. (In Chinese)
Lim, S. (1999). Creative skills and Chinese teaching and learning. In: Chua, C. L. (Ed.), *Creative Teaching and Learning Technologies*, 25-38, Singapore: SNP Edition. (In Chinese)
Looi, C.-K., Hung, D., Chen, W., & Wong, L.-H. (2006). A research agenda for fostering deep learning mediated by technologies: Perspective from Singapore. *Global Chinese Journal on Computers in Education, 4*(1-2), 85-100. (In Chinese)
McCutchen, D. (1988). "Functional automacity" in children's writing: A problem of metacognitive control. *Written Communications, 5,* 306-324.
Mori, Y., Sato, K., Shimizu, H. (2007). Japanese language students' perceptions on Kanji learning and their relationship to novel Kanji word learning ability. *Language Learning*, *57*(1), 57-85.
Peckham, I. (1996). If it ain't broke, why fix it?: Disruptive and constructive computer-mediated response group practices. *Computers and Composition*, *13*, 327-339.
Pelgrum, W. J. (2001). Obstacles to the integration of ICT in education: Results from a worldwide educational assessment. *Computers & Education*, *37,* 163-178.

Pennington, M. C. (2003). The impact of the computer in second language writing, In B. Kroll (Ed.), *Exploring the dynamics of second language writing* (pp. 287-310). Cambridge, England: Cambridge University Press.
People's Daily Online. (2004, February 22). Chinese language losing popularity in Singapore. Retrieved from: http://english.peopledaily.com.cn/200402/22/eng20040222_135475.shtml
Qi, Y. (2003). Never give up your pen while holding a mouse: Reflection on handwriting learning of middle and elementary school students. *Young Teachers, 12*, 42-43. (In Chinese)
Qiu, X. (1990). Chinese character and structural technology: introducing 'Chinese character coding input and shape output technology'. *Shenzhen Technologies*, 5, 14-15. (In Chinese)
Reed, W. M. (1990). The effect of computer-and-writing instruction on prospective English teachers' attitudes toward and perceived uses of computers in writing instruction. *Research on Computing in Education*, *23*(1), 3-27.
Russell, M., Bebell, M., & Higgins, J. (2004). Laptop learning: a comparison of teaching and learning in upper elementary school equipped with shared carts of laptops and permanent 1:1 laptops. *Educational Computing Research*, *30*(4), 313-330.
Selfe, C. L. (1999). *Technology and Literacy in the Twenty-First Century: The Importance of Paying Attention*, Carbondale, Illinois: Southern Illinois University Press.
Shen, H. H. (2002). Level of cognitive processing: Effects on character learning among non-native learners of Chinese as a foreign language. *Language and Education*, *18*, 167-182.
Sim, S. H. (2005). Teaching Chinese composition in Singapore secondary school. In M. S. K. Shum & L. D. Zhang (Eds), *Studies in Writing: Teaching Writing in Chinese Speaking Areas* (pp. 245-258). Netherlands: Springer.
Sullivan, P., & Porter J. E. (1997). *Opening Spaces : Writing Technologies and Critical Research Practices.* Greenwich, Connecticut: Ablex.
Tan, C. (2006). Creative thinking schools through 'Knowledge and Inquiry': The curriculum challenges for Singapore. *The Curriculum Journal, 17*(1), 89-105.
transcription (n.d.). *The American Heritage Dictionary of the English Language, Fourth Edition*. Retrieved February 18, 2008, from Dictionary.com website: http://dictionary.reference.com/browse/transcription
Vician, C., & Brown, S. A. (2000). Unraveling the message quilt: a case-study examination of student interaction in computer-based communication assignments. *Computers and Composition*, *17*, 211-229.
Wang, Y. (2006). *The study report on the elementary school students' learning of keyboard-based Chinese input in selected cities*. Retrieved from: http://220.161.192.10/ndsffx/jiaoxueyd/article_view.asp?id=430 (In Chinese)
Wolfe, E. W., & Manalo, J. R. (2004). Composition medium comparability in a direct writing assessment of non-native English speakers. *Language Learning & Technology*, *8*(1), 53-65.
Wong, L.-H., Boticki, I., Sun, J., & Looi, C.-K. (2011). Improving the scaffolds of a mobile-assisted Chinese character forming game via a design-based research cycle. *Computers in Human Behavior*, published online: April 12, 2011.
Wong, L.-H., Chai, C.-S., & Gao, P. (2010). Singapore primary school students' perceptions and challenges faced in using Chinese computer input systems for compositions. *Global Chinese Journal on Computers in Education, 6*(1-2), 46-61. (In Chinese)
Wong, L.-H., Chin, C.-K., Chen, W., & Chai, C.-S. (2011). V.S.P.O.W. – An innovative collaborative writing process based on Web 2.0 technology to improve Chinese L2 students' writing skills. Global Chinese Journal on *Computers in Education, 7*(1-2), 72-90. (In Chinese)
Wong, L.-H., Chin, C.-K., Chen, W., & Gao, P. (2009). V.S.P.O.W.: an innovative collaborative writing approach to improve Chinese as L2 pupils' linguistic skills. *Proceedings of International Conference on Computer Supported Collaborative Learning 2009* (pp.651-661). Rhodes Island, Greece.
Wong, L.-H., Gao, P., Chai, C.-S., & Chin, C.-K. (2011). Where research, practice and authority meet: A collaborative inquiry for development of technology-enhanced Chinese language curricula. *The Turkish Journal of Educational Technology, 10*(1), 232-243.
Xie, T. (2001). The digitalization of Chinese teaching and learning: The use of vocabulary processing software and its impact in teaching and learning. *Paper presented at: International Conference on Internet Chinese Education 2001*, Taipei, Taiwan. (In Chinese)
Xie, T. (2004). Issues in bridging Chinese Language instructions between American high schools and universities. Retrieved from: http://www.csulb.edu/~txie/papers/University%20Courses%20and%20Articulation%20Issues%202004.pdf (In Chinese)
Xiong, G. (2007). The need to improve handwriting learning among elementary school students. *Modern Educational Science. 2007*(3), 54-57.

Zhang, D. (2009). Essay writing in a Mandarin Chinese WebCT discussion board. *Foreign Language Annals, 42*(4), 721-741.
Zhu, Y., & Hong, W. (2005). Effects of digital voiced pronunciation and stroke sequence animation on character memorization of EFL learners. *Chinese Language Teachers Association*, *40*(3), 49-70.

THE DEVELOPMENT MODEL OF KNOWLEDGE MANAGEMENT VIA WEB-BASED LEARNING TO ENHANCE PRE-SERVICE TEACHER'S COMPETENCY

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ABSTRACT
This research explores that the model of knowledge management and web technology for teachers' professional development as well as its impact in the classroom on learning and teaching, especially in pre-service teacher's competency and practices that refer to knowledge creating, analyzing, nurturing, disseminating, and optimizing process as part of the learning quality improvements. In this process, web technology particular web-based learning has a necessary role to drive and integrate knowledge and learning activities within the knowledge management process (I-Can do model). In this respect, this research aims to study and develop the appropriate model of knowledge management via web-based learning by the 18 expert's consensus and evaluate competency of the 64 pre-service teachers that divide and random assignment into 2 equal groups (control and experimental group). The competency assessment tools are conducted the volunteer participants' competency particularly in knowledge, attitude, and skills approach. The research results exhibited that the model of knowledge management via web-based learning was appropriated and enhanced the pre-service teacher's competency.
Keywords: Knowledge Management (KM), Web-Based Learning (WBL), Competency.

INTRODUCTION

Teacher quality is the top contributing factor to student achievement. Quality ongoing professional development contributes to teacher growth and success. The need for professional development that can meet today's educators' demanding schedules, that uses quality content and resources that are available to teachers from any place and any time, and that can deliver relevant, accessible, and ongoing support has stimulated the development of online teacher professional development programs. Online teacher professional development programs make it possible for educators to communicate, share knowledge and resources, and reflect via asynchronous interactions. Moreover, Chai (2010) suggest that the many current ICT-supported reform efforts demand teachers to assume the role of epistemic facilitator of knowledge construction supported by technology. In addition, Koc and Bakir (2010) explored the characteristics of such technology training programs were discussed to help pre-service teachers learn how to use technologies as instructional tools to enhance their teaching and students` learning. The condition of education in Thailand today still has several problems. Especially, the quality of teachers seems shortages (Secretariat of the Council of Education, 2010: 53). Along with the lack of pedagogy training that is not match in the actual practical needs for schools (Keawdang, 2009: 131). Likewise, the competency problems effect on operations of teachers and learners (Ratchatavipasnant, 2009). Particularly, the lack of the good knowledge management let the opportunity to exchange and share knowledge is decreased between them and focuses on the upstream of training from real situations process (Dejakoop and Khangkhan, 2008) furthermore, Lee, et al (2010) have suggests that the common difficulties and limitations regarding the implementation of knowledge management into schools' organizational cultures are reviewed and discussed. In addition, Erkunt (2010) exhibited that students' collective inquiry relied on socially distributed cognitive resources that were generated by their social interactions in class and online using technology. The concept of web-based learning that based on the appropriate tool and the medium to deliver knowledge, and helps learners can communicated with each other (Catherall, 2008) especially in teaching and learning using the potential of internet network to access with various sources of learning (Speranza, 2008). The main purpose of this study is to research and develop activities to be appropriate with the learners that integrated with the concept of knowledge management and web technology. The question then becomes, "How to develop the appropriate model of knowledge management via web-based learning to enhance pre-service teacher's competency". The expected benefits are the appropriate model that is the systematic approach to enhance pre-service teacher's training. More over the results of quality assessment of model that is body of knowledge to develop the pre-service teacher's curriculum. In addition the results of pre-service teacher's competency assessment by using the knowledge management model via web-based learning that are information to support the educational systems policy maker.

THE STUDY

The first phase: Studying the model of knowledge management via web-based learning to enhance pre-service teacher's competency.

1. Analyzing the elements of knowledge management (KM) are included the knowledge management activities: Creating (Explore and Capture), Analyzing (Identify and Organize), Nurturing (Utilize and Demonstrate), Disseminating (Transfer and Share), and Optimizing (Evaluate and Improve)
2. Analyzing the elements of web-based learning (WBL) are included the elements of web-based learning (instruction, interaction, and internet) and web technology (collaboration, communication, and storage technology).
3. Analyzing the elements of competency (Knowledge, Attitude, and Skill approach).
4. Integrating the elements of knowledge management, web-based learning and competency.

The second phase: Developing the model of knowledge management via web-based learning to enhance pre-service teacher's competency and competency assessment tools.

1. Developing the model of knowledge management via web-based learning.
2. Developing the competency assessment tools that include the achievement test, attitude test, and performance test.
3. Developing the efficacy of the model of knowledge management via web-based learning to enhance pre-service teacher's competency.

The third phase: Evaluating the model of knowledge management via web-based learning to enhance pre-service teacher's competency.

1. Research design by following the Two-Group Posttest Only Design.
2. Population and samples:
   2.1 Population are the first year pre-service teachers who study in 2ndsemester, 2010 academic year at faculty of Education, Chandrakasem Rajabhat University, Thailand.
   2.2 Samples are random sampling the 64 pre-service teachers that divided into 2 groups: The first group is 32 peoples for experimental group and the other group is 32 peoples for control group.
3. Research tools:
   3.1 The model of knowledge management via web-based learning.
   3.2 The competency assessment tools (knowledge test, attitude test, and performance test).
4. Data analysis:
   4.1 Descriptive statistics ($\bar{x}$ and S.D.) are used to describe the basic features of the data.
   4.2 Inferential statistics (t-test with independent sample) are used to compare the data between control and experimental group.

FINDINGS

1. The model of knowledge management via web-based learning to enhance pre-service teacher's competency — I-Cando model was appropriated with the 18 expert's consensus.
   1.1 Input step: comprise that the elements of web-based learning (Instruction, Interaction, and Internet: I^3) and web technology (1.Collaboration technology: Wikis, Blogs, Forum, Peer review. 2. Communication technology: Skype, Presenter, Twitter, SLOODLE. 3. Storage technology: YouTube, Data mining, Mind Map) — I^3 - WBL (Figure 1)

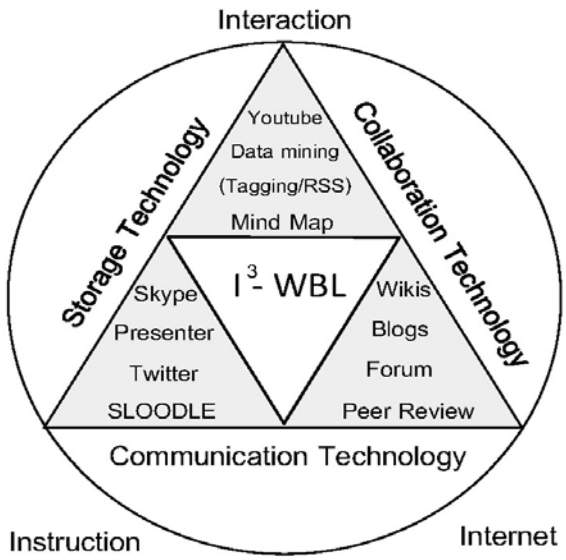

Figure 1: The elements of web-based learning and web technology— I ^{3} – WBL

1.2 Process step: comprise that the elements of knowledge management (KM) are include the knowledge management activities: Creating (Explore and Capture) is driven by Benchmarking: B_1 activity, Analyzing (Identify and Organize) is driven by Communities of Interest: C_1 activity, Nurturing (Utilize and Demonstrate) is driven by After Action Review: A-A-R activity, Disseminating (Transfer and Share) is driven by Communities of Practice: C_2 activity, and Optimizing (Evaluate and Improve) is driven by Best Practice: B_2 activity — I-Can do model (Figure 2).

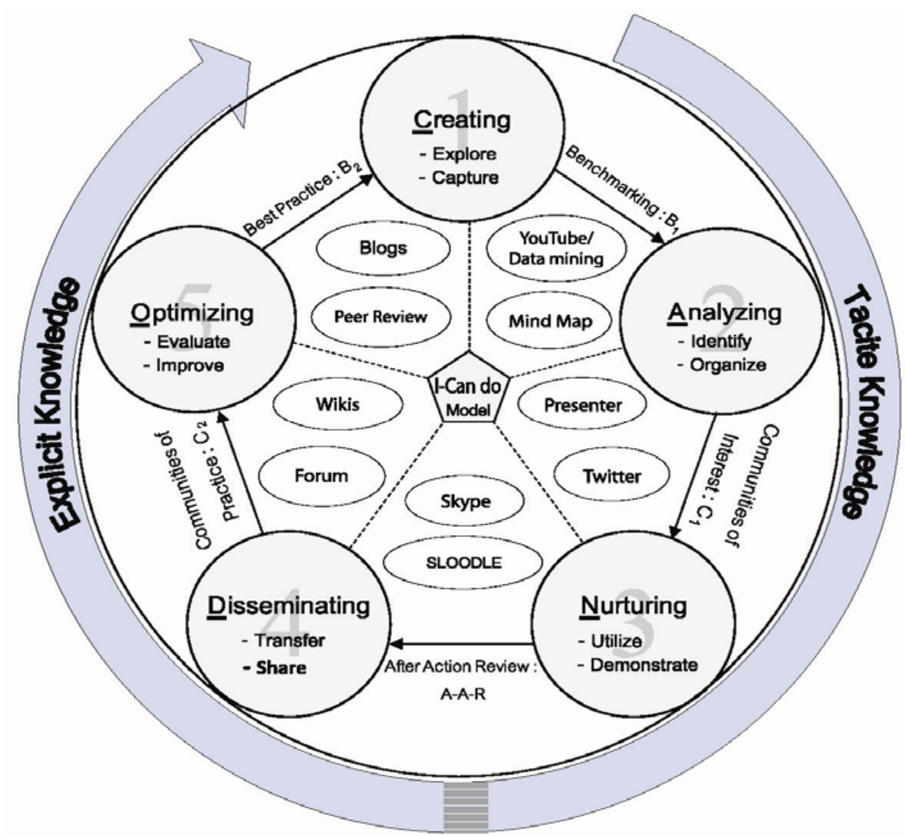

Figure 2: The elements of knowledge management process— I-Can do model

1.3 Output step: comprise that the elements of competency (Knowledge, Attitude, and Skill— KAS approach) and evaluate by Knowledge, Attitude, and Performance assessment (Figure 3).

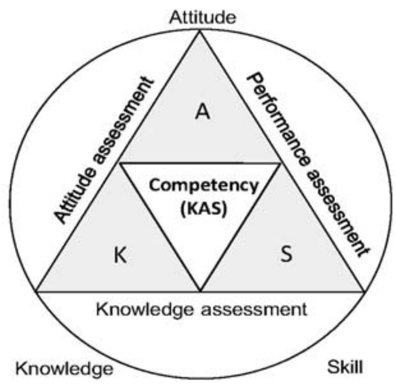

Figure 3: The elements of competency— KAS approach

2. The efficacy of knowledge management via web-based learning model was appropriated with the volunteer participants' competency (E1 / E2 = 86.23/85.33) that accord with the efficacy criteria of web-based learning (85/ 85 Standard) (Brahmawong, 2002; Whattananarong, 2004) (Table 2).

Table 2: The efficacy of knowledge management via web-based learning model

volunteer participants (n=30)	**Formative efficacy evaluation: E_1 score = (40)**	**Summative efficacy evaluation: E_2 score = (40)**
1	25	24
2	26	26
3	27	25
4	24	24
5	25	23
6	26	26
7	28	27
8	25	25
9	27	26
10	24	23
11	25	25
12	24	26
13	25	24
14	26	26
15	25	25
16	28	28
17	26	25
18	27	26
19	25	24
20	28	27
21	27	28
22	26	25
23	25	26
24	27	27
25	26	26
26	24	24
27	25	26
28	27	29
29	28	28
30	25	24
$(\sum x)$	776	768
$\bar{x}$	25.87	25.60

E1 / E2	$E_1 =$ [illegible] x 100 = [illegible] x 100 = 86.23	$E_2 =$ [illegible] x 100 = [illegible] x 100 = 85.33

3. The model of knowledge management via web-based learning was enhanced the pre-service teacher's competency (Knowledge, Attitude, and Skill assessment). The research findings revealed that the competency of pre-service teacher exhibited the experimental groups was high competency than control group at the 0.05 level of significance (Table 3).

Table 3: Comparison of competency assessment (control and experimental group)

Competency	Group	n	$\bar{x}$	S.D.	t	p
Knowledge	Experiment	32	23.09	2.59	4.47	.000
	Control	32	20.44	2.13		
Attitude	Experiment	32	4.01	0.26	8.07	.000
	Control	32	3.48	0.27		
Skill	Experiment	32	16.44	1.05	6.89	.000
	Control	32	14.53	1.16		

$p < .05$

CONCLUSIONS

The research results exhibited that the model of knowledge management via web-based learning was appropriated and enhanced the pre-service teacher's competency. Norbert Pachler, et al (2010) have suggests that teachers' participation in online communities exists in complex interrelationship with other learning practices, only some of which use technology. Collaborative professional development involves the use of technologies for the sharing of experiences and artifacts within and across schools as a basis for critical reflection on pedagogy. Developing and sustaining an effective online learning community can be challenging even in the midst of an era of much technological advancement. More over developing and sustaining an effective large-scale online community is even more challenging. As online teacher professional development is an emerging trend it is still a "new frontier." Educators around the world experience many demands on their knowledge, time, and professional development (Zygouris-Coe and Swan, 2010). In addition, professional development has mainly centered on training processes that involve updating knowledge, yet it has made little headway as a construct that includes both the professional and personal characteristics and working conditions. It has also focused more on developing training program than on analyzing the tools for continuous training (Gairín-Sallán and Rodríguez-Gómez, 2010). Finally, online learning technologies have the potential to transform the professional development of teachers; penetrate cultural, discipline, and other barriers; bring educators together to learn, share successes and challenges; and co-construct and transfer learning.

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REFERENCES

Brahmawong, Chaiyong. (2002). *Production of E-learning Courseware*. Nontaburi: Sukhothai Thammathirat Open University Press.

Catherall, Paul. (2008). *Delivering E-learning for Information Services in Higher Education.* Oxford, Chandos Publishing.

Chai, Ching Sing. (2010). Teachers' Epistemic Beliefs and their Pedagogical Beliefs: A Qualitative Case Study Among Singaporean Teachers in the Context of ICT-Supported Reforms. *TOJET: The Turkish Online Journal of Educational Technology*. October 2010, volume 9 Issue 4.

Dejakoop and Khangkhan. (2008). *Performance, teachers and guidance teachers in the development of social change.* Bangkok: Prigwhan graphics.

Erkunt, Hamdi. (2010). Emergence of Epistemic Agency in College Level Educational Technology Course for Pre-Service Teachers Engaged in CSCL. *TOJET: The Turkish Online Journal of Educational Technology*. July 2010, volume 9 Issue 3.

Gairín-Sallán, J. and Rodríguez-Gómez, D. (2010) *Teacher Professional Development through Knowledge Management in Educational Organisations* Universitat Autònoma de Barcelona, Spain. Online Learning Communities and Teacher Professional Development: Methods for Improved Education Delivery. Information Science Reference (an imprint of IGI Global) New York: USA.

Keawdang, Rung, 2009. *Revolutionize education Thailand.* Bangkok: Matichon Publishing.
Koc, Mustafa and Bakir, Nesrin. (2010). A Needs Assessment Survey to Investigate Pre-Service Teachers' Knowledge, Experiences and Perceptions about Preparation to Using Educational Technologies. *TOJET: The Turkish Online Journal of Educational Technology*. January 2010, volume 9 Issue 1.
Lee, Chi-Lung, et al. (2010). A process-based knowledge management system for schools: a case study in Taiwan. *TOJET: The Turkish Online Journal of Educational Technology*. October 2010, volume 9 Issue 4.
Norbert Pachler, et al (2010) *Teacher Professional Development Practices The Case of the Haringey Transformation Teachers Programme.* Online Learning Communities and Teacher Professional Development: Methods for Improved Education Delivery. Information Science Reference (an imprint of IGI Global) New York: USA.
Ratchatavipasnant. (2009). *Report on research and development of physical network science teachers in secondary schools under the Department of General Education.* Bangkok: Prigwhan graphics.
Secretariat of the Council of Education. (2010). *Report to the Thai public education environment: reform knot.* Bangkok: Primdee publications.
Speranza, N. (2008). *e-Learning and its benefits to the Distance Learner in an Institution of Higher Learning: Designing an interactive course.* (CD-ROM). Suan dusit Rajabhat University, Bangkok: Amazing e-Learning II: International Conference and workshop on e-Learning Strategies.
Vassiliki I. Zygouris-Coe and Bonnie Swan. (2010) *Challenges of Online Teacher Professional Development Communities A Statewide Case Study in the United States.* Online Learning Communities and Teacher Professional Development: Methods for Improved Education Delivery. Information Science Reference (an imprint of IGI Global) New York: USA.
Whattananarong, Krismant (2004). *The Effects of Internet-Based Teaching and Learning Systems on Learners*. The Journal of King Mongkut's Institute of Technology North Bangkok. Vol. 14, No.3, Jul– Sep, 2004, pp. 32-39.

THE DEVELOPMENT OF E-DICTIONARY FOR THE USE WITH *MAHARAH AL-QIRAAH* TEXTBOOK AT A MATRICULATION CENTRE IN A UNIVERSITY IN MALAYSIA

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ABSTRACT
This is an action research to develop an E-Dictionary for the use with Maharah al-Qiraah (Reading skills) textbook at a matriculation centre. The research attempts to answer four research questions: a) What is the database model for an electronic dictionary using Microsoft Access for the use with Maharah al-Qiraah textbook? b) What are the features of a user-friendly electronic dictionary? c) How suitable is an E-Dictionary for the use with Maharah al-Qiraah textbook? and; d) Is E-Dictionary suitable and easy to use? Two types of instrument are used for the research: the E-Dictionary itself and two sets of evaluation form filled by three experienced Arabic teachers and 3 computer experts. The data obtained from questionnaires are analysed using Statistical Package for Social Science (SPSS) version 11.0 to obtain the mean of the evaluation form. The results of the study indicate that an electronic dictionary model using Microsoft Access is valid and suitable. Presenting electronic dictionary in a CD-ROM with an attractive screen is the major feature of a user-friendly electronic dictionary. E-Dictionary is also valid in terms of the Maharah al-Qiraah textbook content and it is convenient to use. The findings of this study is hoped to provide information on the development of Arabic electronic dictionary.

INTRODUCTION

Language proficiency can be measured through the ability to acquire the skills of a language. These skills include listening, speaking, reading and writing (Mansur, 1982, To'aimah, 1985). Reading skill is one of the key components in mastering a language. Hence the ability in acquiring this skill becomes one of the tools to assess upon learning a certain language.

Reading skill refers to the ability to spell or translate a symbol or a letter, as well as the ability to understand the overall content of the reading material. This understanding depends upon the knowledge of a student on the definition of words i.e. mastery of the vocabulary. Thus, students with a wider range of vocabulary have a better understanding of the language rules and techniques.

As mentioned by Dahan (2005) in his research, most of the religious stream students in Malaysian universities still face the problem to understand Arabic despite their exposure to the language for several years during their school time. It also showed that the understanding of the language among them were still very weak.

Widening ones vocabulary goes hand in hand with mastering the dictionary. This signifies that students can increase their vocabulary and at the same time enhance their understanding by referring to the dictionary thus improving their reading skill. In general, these showed the importance of dictionary in language learning process as well as serving the means to improve students' reading skill. This is very essential to ensure that the students understand the content of the material.

Dictionary is one of the tools to assist students' understanding as well as enlightening the skill of reading. Reading would be interesting if students can understand the material, and this is when the dictionary plays its role as a medium to facilitate the students in reading. Hence, this overcomes the difficulties in understanding the reading material.

Nonetheless, several researches have revealed that students would prefer a teacher rather than dictionary. (Hassan, 1999 Mohamad, 2003). This is due to the attitude of the students and the physical form of the

dictionary which is big and thick. This requires more time to search for the definition of a word compared to asking for the teacher's assistance.
Apparently, with the development of science and technology, computer is seen as one of the effective teaching and learning aid. With the existence of this technology, an electronic dictionary would certainly give ease to the teaching and learning process as well as benefiting both teachers and students. This dictionary is created in a database with colourful texts and attractive interface loaded with graphic and sound which hopefully will increase the interest of the students to use the dictionary, thus improving their reading skill.

STATEMENT OF PROBLEM
Previous studies on dictionary focused on the aspect of its application and implication towards teaching and learning process. The results showed that frequent use of dictionary have actually improved students' learning process. (Hassan, 1999 and Mohamad, 2003). However, this study also showed that the use of dictionary among the students was still unsatisfactory. This is due to several factors such as the nature of the dictionary i.e. big and heavy. Referring to the dictionary is considered as tedious due to students' insufficient knowledge of the root word. As a consequence, the word search takes up a lot of time and they end up in boredom.

The development of technology has contributed to the improvement of education process. Such technology has to be maximized if this were proved to increase the interest of students and improved their performance (Saad, 2003:95). This said, it can be implied that the development of computerized dictionary would attract students' interest in using dictionary.

Conducting a research is necessary to analyze the effectiveness of an Arabic electronic dictionary in enhancing the command of language especially in relation to reading skill. This research focuses on developing a database for electronic dictionary. There are a lot of database programmes such as *Microsoft Access*, *Oracle*, and *Dbase*. One of the most common and easy to learn is *Microsoft Access* (Fewell and Gibbs, 2003:113).

This research does not compare the effect of using a manual to an electronic dictionary but rather more on the benefit of using an electronic dictionary with user friendly features.

It is hoped that the electronic dictionary would consist of these two elements: a) suitability and accuracy from the design of an electronic dictionary b) easy to use and user friendly features.

The development of electronic dictionary is hoped to attract students' interest to fully utilize the electronic dictionary as less time is needed to locate the meaning of a word. It will also help to reduce teachers' difficulties in understanding the teaching materials as well as to accomplish the lesson objectives. From the management point of view, it is hoped to realize the mission of the matriculation centre to become an excellent academic institution.

RESEARCH OBJECTIVES
The objective of this research is to develop a database for an electronic library to help students to accurately identify the meaning of a word in a short period of time. The research focuses on the following aspects:

1. To produce a database using *Microsoft Access*
2. To develop an E-Dictionary with user friendly features for the *Maharah al-Qiraah* textbook.
3. To evaluate the suitability of E-Dictionary with *Maharah al-Qiraah* textbook.

RESEARCH QUESTIONS
Specifically, this research is hoped to answer the following questions:

1. How should the design of the database using *Microsoft Access* in the development of E-Dictionary, used with *Maharah al-Qiraah* textbook?
2. What are the features needed in the E-Dictionary to make it user friendly?
3. How accurate is the E-Dictionary for the *Maharah al-Qiraah* textbook?
4. Is the E-Dictionary reliable and easy to use?

SIGNIFICANCE OF RESEARCH
This research is very important for the improvement of teaching aids in the Arabic reading skill while, the E-Dictionary will help teachers and students in the matriculation centre to use the *Maharah al-Qiraah* textbook. Moreover, the use of E-Dictionary will benefit other higher learning institutions depending on the students' language proficiency and the content of the book they use.
This research will be fundamental for other researchers to develop a computerize database system in the process of teaching and learning Arabic language.

This research also serves as a prototype database system so that other researchers can evaluate the database towards improving its contents, approach and development. In addition, this will also develop an attractive, user friendly and an improved teaching tool.

LIMITATIONS OF RESEARCH

As an engine for the electronic dictionary database, the development of E-Dictionary is only limited to *Microsoft Access* although there are many other programs available such as *Oracle*, *Macromedia* and etc.

Because the primary concern of the research focuses on the development of material to develop the E-Dictionary, i.e. planning, design and data input; it does not involve any experiment on any group of students.

This computerized data software is limited to *Maharah al-Qiraah* published by Centre for Language and Pre-University Academic Development (CELPAD), International Islamic University Malaysia (IIUM). The book is used specifically to improve reading skill. The content of this book is divided into ten units. Each unit consists of comprehension texts and exercises.

This research comprises data or words only from the comprehension texts without words from the exercise unit. This is due to the wide range of content and the words were repeated in the exercise unit. It also includes on structuring and designing an attractive electronic dictionary features.

This research concentrates on the development of the database system. So there will not be any voice and sound aspect being introduced. It focused on the clear text presentation and the use of attractive colours only.

The data used a single language dictionary which only applies for Arabic language. The entry words and the explanations were only used using the same language. The entry words were referred to '*Al-Mukjam Al Arabi al-Asasi*'(Basic Arabic Dictionary) as the main reference material. This approach is suitable for the teaching techniques using '*tariqah mubashirah'* (direct approach) which is not using the mother language for the translation. Direct approach is more effective compared to translation and grammar (Dahan, 2005:71).

For evaluation purposes, only experienced Arabic teachers and computer experts were assigned to assess the suitability of E-Dictionary to be used with *Maharah al-Qiraah* textbook. The opinion from these two groups was considered adequate to evaluate the effectiveness of this program.

The data developed from this research was obtained from the evaluation forms. Therefore, the data obtained depend upon the items from this particular form. The researcher has to ensure that the items in the evaluation form were valid and reliable to answer the research questions.

GLOSSARY

Dictionary – refers to a book that explains words like spelling, intonation, word category, definition, method, the use of word, etymology and others depending upon precisions of the dictionary.

Database – refers to a group of information about a systematically arranged data in a media to be used as reference, normally computerized. (*Education Technology Glossary*, 1995:58).

Microsoft Access – refers to related data management system used to manage the information system, from simple address book to complex inventory management system (Rashid and Ismail, 2002:19).

Electronic Dictionary – refers to a dictionary used in electronic background whether in a compact disc or online. The difference between printed and electronic dictionary is that the latter can handle a larger amount of data and operate translation. This efficiency found in the electronic dictionary has made it more practical and feasible to combine sound, visual and text (Al-Rabi'i et.al. 2001:146).

LITERATURE REVIEW

This research is to develop an electronic dictionary. It is carried out based on the continuous upgrading to the traditional dictionary. The researcher has observed the views and findings from previous researchers on matters affecting upon developing a dictionary.

Development of Dictionary

Dictionary plays an important role in learning a language. A good dictionary consists of the various parts of speech and it also acts as a reference for the purpose of an excellent and accurate language (Deraman, 1994:3).

The development of a language can be observed through the dictionary. The creation of dictionary reflects the progress and expansion of a language and knowledge. Its development has been going on for several eras from traditional book to the use of technology such as computerized dictionary or electronic dictionary (Karim, 1994). The field of lexicography or dictionary development has already achieved its advanced maturity stage.

Advantages of Using Dictionary

Dictionary can serve a lot of purposes especially in providing the definition of words. Omar and Mansor (2005) stated that the main use of dictionary is to provide the meaning of a word, to check on correct spelling, correct pronunciation and vocabulary.

Using dictionary can improve students' learning ability. Mohamad (2003) has done a research on the use of dictionary and it was found that the students' ability to learn Arabic has increased. The result also showed that the students' achievement in answering comprehension questions has increased when using the dictionary.

The use of dictionary does not only improve students' proficiency in second language but also helps to increase the command of their mother language. Ghazali (2000:92) in her research found that the students that use single language have shown good result in word expansion activity compared to students that did not have the skill to use the dictionary.

The dictionary can also improved self learning activity and would also motivate the students to read more materials according to their interest.

Problems When Using Dictionary

Mohamad (2003:115) in her research found that the use of dictionary in high school was unsatisfactory. It was also found that the Arabic teacher did not make full use of the dictionary when teaching in class.
The purpose of the dictionary is to help users to get the information accurately. However, students do not refer to the dictionary due to several problems. According to Hassan (1999:114), the reasons are; there were too many meaning of the root word, difficulty in searching for the root word and classic word. He also stated that similar problem occurs in the use of English dictionary especially on pronunciation.

DEVELOPMENT OF COMPUTERIZED DICTIONARY

Computerized dictionary is one of the ways to develop teaching tools using modern technology. Generally, it was known that the use of modern technology has given a positive impact in the teaching and learning process. According to Ahmad (1994:81), the use of computer in dictionary has started since the 19th century. However its development was only active since the past 50 years. It was initiated at the time when the research on computer aided translation (CAT) or machine translation was carried out.

According to Deraman (1994:8), a memorandum of understanding between *Dewan Bahasa dan Pustaka* (DBP) - *Universiti Sains Malaysia* (USM) was made on 27th October 1993 and a corpus system was established. Ahmad (1994:85) added that this early cooperation had established a memorandum of understanding in order for USM to develop three main computerized systems which include Corpus System, Dictionary Database System and Arrangement System.

The development of science and technology has encouraged education technology. According to Omar and Mansor (2005:81), this development has inspired the invention of several communication and technology tools to further improve the development of mass and rapid information. This information has been produced in different format and media. Eventually this has spillover effect and has helped to the development of electronic dictionary which is also known as E-Dictionary.

TYPES OF ELECTRONIC DICTIONARY

According to Al-Rabi'i et.al.(2001:146), electronic dictionary can be divided into two different types:

1. An online electronic dictionary – This dictionary is provided on the World Wide Web also known as internet dictionary. The dictionary is directly used from the internet. Some of the websites offered are free and some of them imposed an annual fee. The advantage of using this dictionary is that it can be used at any place as long as there is internet connection. However, it takes up a lot of time caused by the busy internet connection.
2. Offline dictionary – It is in the form of compact disc. This type of dictionary can be used with a computer or a personal data assistant (PDA). The advantage of using this type of dictionary is that users are free from the interruption of internet connection and the disadvantage is that it requires an expensive tool.

Conceptual Framework
E-Dictionary is developed according to 4 steps:

1. Data
   Collecting and entering the input data - The *Maharah al-Qiraah* has been chosen to be the first raw data whereas 'Al-Mukjam Al-Arabi Al-Asasi' will be the second. Both of them will be arranged and processed suited to the database software.
2. Database
   Identifying the software using a systematic arrangement and data processing - *Microsoft Access* is chosen as the database software. A few steps needed to be taken to arrange the data, such as building tables, queries and reports.
3. Evaluation
   The program needs to be evaluated according to its accuracy and suitability - Groups of evaluator which consist of experienced teachers and computer experts were chosen to evaluate the E-Dictionary. Their proposal will also be considered for the purpose of improvement of the dictionary.
4. Improvement
   The improvement work is made based upon the proposal of the evaluator whilst restricted to the objective of this research.

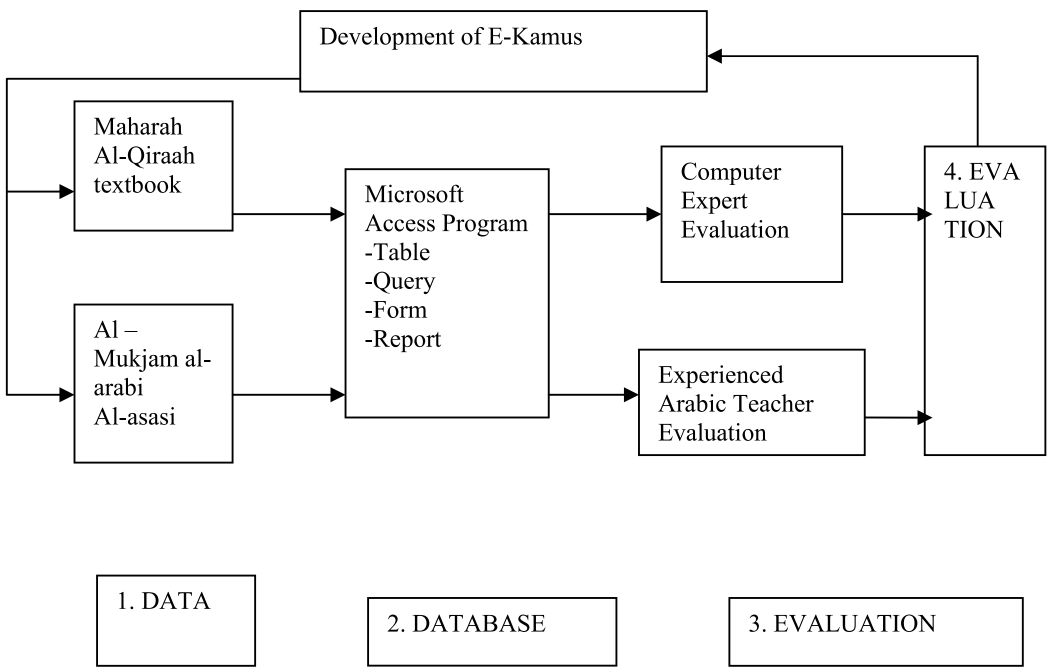

Figure 1: The Framework of E-Dictionary Development

RESEARCH METHODOLOGY
Research Design
This is an action research to create an electronic dictionary database for E-Dictionary using *Microsoft Access* together with *Maharah al-Qiraah* textbook at a matriculation centre. The evaluation program is carried out by two groups of evaluators consisting of experienced Arabic teachers and computer experts. The computer experts will look at the suitability of *Microsoft Access* and the user friendly features, while the experienced teachers will look from the aspect of suitability and the application of E-Dictionary to the *Maharah al-Qiraah* book.

Sample Evaluator
This research involved two sample evaluators to answer the research questions. The first group consists of three experienced Arabic teachers with five years experienced in teaching *Maharah al-Qiraah*.

The second group consists of three computer experts in database and programming. Two of them are involved in teaching *Microsoft Access* as one of the core subject in a matriculation centre and one of them has a vast experienced in developing program using *Microsoft Access*. He has developed several programmes using the *Microsoft Access* for University of Malaya (UM); a human resource information system, pension information system and ACATIS (Automated Computer-Aided Time-Tabling System) for the Islamic Study Academy.

Research Instrument

The researcher used two instruments to collect the data:

1. E-Dictionary: Electronic Dictionary Database.
   An electronic dictionary database is developed. The data collected is based on the *Maharah al-Qiraah* book. The development of the database is constructed based on the systematic instructional design ADDIE (Analysis, Design, Develop, Implement, and Evaluate) which involved the following steps: Figure 2:

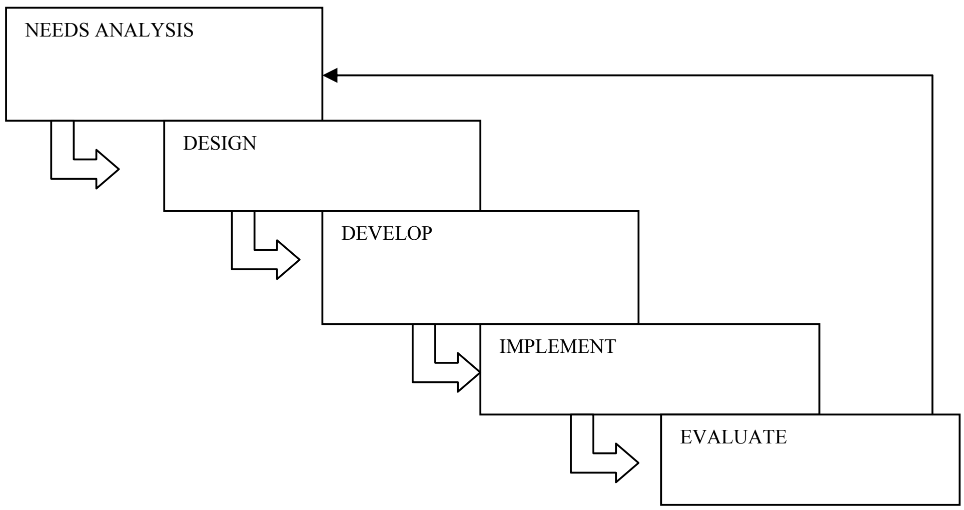

Figure 2: Systematic Instructional Design Model (ADDIE)

2. Evaluation Form
   Two sets of evaluation form were designed to answer four research questions. The entire instruments used in this research are developed and suited based on instruments suggested by Ahmad (1993), while the items in the instrument are based on previous researches by Abas (1993) and Kadir (2002). Instrument items concerning the features of electronic dictionary are developed and suited to the methodology suggested by Al-Rabi'i et.al., (2001).

DATA ANALYSIS

Data collected from the survey is analyzed in the mean form using descriptive statistics. The information is tabulated in an easy format so that the reader may understand easier. The mean is shown in the table below:

Mean	Level
1.00 – 2.33	Low
2.34 – 3.66	Medium
3.67 – 5.00	High

Source: Khamis, Masni (2001)

Table 3.2: Level based on Mean

Data Analysis Techniques

The data collected is analyzed using descriptive statistic procedures suitable for the four questions asked. Data from both groups and their evaluation forms are coded to be analyzed using SPSS.

RESULTS AND DISCUSSIONS

Results

Both the experienced teacher and computer experts showed positive feedback from their evaluation. The computer experts have agreed on the use of *Microsoft Access* as an electronic dictionary database. They also have agreed from the aspect of design, interactive and user control, presentation techniques, stability of the program and its application. The results showed that the electronic dictionary is preferred in a compact disc format with an attractive screen presentation and colours.

The experienced teachers agreed that the E-Dictionary is suitable based on several aspects such as its contents, educational and user friendly features, the systematically arranged documents application technique and the ease of understanding the whole application.

Discussions of the Result

The discussions can be divided into four sections (a) design of electronic dictionary database using *Microsoft Access*; (b) user friendly features; (c) suitability of E-Dictionary for *Maharah al-Qiraah* book and (d) the suitability of E-Dictionary on application.

Design Of Electronic Dictionary Database Using Microsoft Access

The main focus of this section is to determine that the design of electronic dictionary database using *Microsoft Access*. The results are simplified into six situations: 1) reliability and accuracy of *Microsoft Access* as a database for the E-Dictionary; 2) the design of E-Dictionary; 3) interactive features and control of E-Dictionary by the end user; 4) robustness of the E-Dictionary; 5) accepted application method of E-Dictionary.

The characteristic of *Microsoft Access* program made the computer experts agree that it can be used as a database for the electronic dictionary with highest mean score of 4.33. This result supports a research by Lockard and Abrams (2004:145) that database program should be encouraged to support an effective teaching and learning process. For improvement, the form should be updated and the display setting should be made more attractive.

From the design aspect, they have agreed that the E-Dictionary ability to receive and respond have the highest mean score of 4.67.

Interactive features and controllability by the end user have received a score of 4.67. With simple use of menu and search method, it is shown that the E-Dictionary is suitable and easy to use.

The presentation techniques of E-Dictionary via easy-to-read features, consistent screen arrangement, and appropriate font have received a notably high mean score of 4.33. It shows that the presentation of E-Dictionary is attractive and acceptable by the users.

The computer experts have given the highest mean score to reliability through a nonstop application or failure having a score of 4.67. There are no technical errors reported while an excellent system flow further supported the reliability of E-Dictionary with a score of 4.33 score.

From the documented application techniques of E-Dictionary, the information with easy-to-read features and simple instructions have received a score of 4.67. This shows that the techniques are clear, accurate and simple to follow.

User Friendly Features of Electronic Dictionary.

This research proves that the capability of electronic dictionary to be used in a compact disc form with attractive display and colours have a fairly high mean score of 4.67. This shows that in order for the electronic dictionary to be user friendly, the aspects above are compulsory and need to be satisfied. The result is supported by the research done by Keong (2000:57) where he claimed that the CD-ROM capacity to store up to 650MB has become one of the significant medium of information. The result is further supported by Zain (2002:81) where the CD-ROM has become one of the media that can be utilized in teaching and learning process.

A flexible search method is one of the extra features to find the meaning of a word based on the requirement of users. This feature is considered important with a score of 4.33.

Combination of audio and visual are also considered essential where these features can help users to pronounce the word correctly as well as to understand the word further (Mean = 4.33). Although the features from the internet dictionary has a lower value compared to other features (Mean=4.0), it is still considered relevant to the research. This is supported by a research done by Keong (2000) stating that the internet plays a role in computer based teaching and learning process. The use of internet dictionary is hoped to help users to search the definition of a word faster regardless of place and time. This can be realized with the existence of internet centers all over the country.

Suitability of E-Dictionary for Maharah al-Qiraah Book
This section focused on the application of E-Dictionary on *Maharah al-Qiraah*. The results are divided into two sections: (a) the content of E-Dictionary (b) education values.

Generally, the experienced Arabic teachers stated that the contents of E-Dictionary are suitable to be used with *Maharah al-Qiraah* in several aspects: (a) accuracy (mean = 5.0); (b) appropriate language expression (mean = 4.67); (c) minor spelling error (mean=4.67) and (d) significance to education needs.

However, the aspects of minor spelling error have received a score of 3.67 compared to others. This means that the researcher needs to make some correction on the spelling errors for the *Maharah al-Qiraah* book.

On educational values, the experienced Arabic teachers evaluated the E- Kamus into several aspects: (a) encouraging students' interest to utilize the dictionary (mean 5.0), (b) increasing the student's motivation (mean 5.0), (c) maximizing the teachers' needs for training skills (mean 4.67) and (d) it would help the students to develop their reading skills. The result is supported by Abas (1996:129); computer based teaching and learning process could help students to understand the lesson better. It is also supported by Ashaari (1999:140); that the use of teaching can ignite students' interest.

The Suitability of E-Dictionary on its Application
The main focus of this section is to evaluate the appropriateness of E-Dictionary from the aspect of application. The main result from this research is divided into several factors: (a) ease of use or user friendly features (mean 5.0); (b) clear instruction (mean 5.0) and (c) time-saving (mean5.0) while the presentation factor received a score of 4.33, which shows that the E-Dictionary needs improvement on the presentation or display to make it more attractive.
From the documented application techniques of E-Dictionary, the experienced Arabic teachers evaluated that the E-Dictionary is easy to use according to the following reasons: (a) systematically arranged data (mean5.0); (b) easy to understand (mean5.0); (c) simple instruction and (d) complete data (mean 4.33). The results are supported by the guidelines provided by Mahmud and Ahmad (2004:370).

IMPLICATIONS OF RESEARCH
The results from this research have shown that the development of E-Dictionary is accurate, appropriate and easy to be used together with *Maharah al-Qiraah* book at the matriculation centre. However, the effectiveness of E-Dictionary depends on the facilities provided and users' behaviour towards the development of education technology.

Computer facilities are a major factor to determine the effectiveness of E-Dictionary. Without the use of computers in classrooms, this will result in an ineffective use of E-Dictionary. Therefore, it is suggested to the management of the matriculation centre to equip each classroom with computers and provide a personal computer to each lecturer to support the teaching and learning process. Other facilities such as LCD projector and screen are also considered important as teaching tools.

The users' attitude also plays an important role in the use of E-Dictionary. A positive attitude would help users to try the computer-based software. On the other hand, a negative attitude would isolate and hinder users from the development of education technology thus would affect the effort of the matriculation center to be an excellent academic institution.

The research has found that *Microsoft Access* is a suitable database program to be used for teaching and learning process. Hence, it is proposed that the management should conduct a course on *Microsoft Access* to educate and equip teachers in developing other type of database for educational purposes.

From previous research, the use of dictionary resulted in a positive effect to the students learning process (Mohamad, 2003:37). As a result, the students are advised to make full use of the E-Dictionary due to its user friendly and time-saving features. The management should encourage students to use computerized application such as E-Dictionary in teaching and learning process because this can help teachers to achieve the lesson objectives.

Suggestions for Improvement
From the result of this research, a few suggestions are proposed for the improvement of electronic dictionary in classroom application. This research has suggested a few actions that can be applied for the benefit of Arabic teaching and learning process.

Insertion of the Audio and Sound Elements
For researchers who want to conduct a study on developing an electronic dictionary, the audio and sound elements should be included. These elements can help users to pronounce the word accurately and encourage them to use the dictionary thus developing a broad command of vocabulary.

Bilingual Electronic Dictionary
It is recommended that the electronic dictionary would be bilingual i.e. Arabic to Malay. Even though it is sufficient to use single language electronic dictionary in learning a second language, the nature of electronic dictionary should be in bilingual format to help general users understand the word better.

Attractive Display
An attractive display can encourage the students to use the dictionary more frequently. It is proposed that the display of electronic dictionary should be presented in an interesting and attractive colour display. The application of menu selection display suited to users' choice will definitely attract their attention.

Provide Easy Internet Connection
The internet facilities should be used wisely. Providing online electronic dictionary would help users to find the definition of a word easier, at any place and anytime. This would take less time to retrieve information on a word in line with the advancement of technology which allows access on information at our fingertips.

Suggestions for Further Research
From the point of view of the researcher, studies on Arabic dictionary should cover all skills in Arabic language therefore a longer research period should be allocated for this purpose. This research is very crucial because it can contribute to the development of dictionary and motivation towards Arabic teaching and learning process.
Further research should be done in order to identify other possible software besides *Microsoft Access* that can be used for electronic database for example *Oracle*, *Dbase* and *Macromedia*.

A comparative study can also be conducted between the use of conventional dictionary and electronic dictionary in the teaching and learning of Arabic. This is to find an effective approach by taking into consideration other significant factors.

Research on developing electronic dictionary in single or bilingual should be carried out to produce teaching aids which applies to the current education technology development.

CONCLUSION
This research has proven that the E-Dictionary developed for the *Maharah al-Qiraah* textbook at the matriculation centre has gained positive remark from computer experts and experienced Arabic Teachers.
It is discovered that the *Microsoft Access* program is suitable to be used as a database for developing the electronic dictionary. The E-Dictionary adopts the design of an electronic dictionary with user friendly features in a CD ROM format using interesting and attractive colour display.

The research has also shown that E-Dictionary can help the teaching and learning process of the *Maharah al-Qiraah* with savvy, smooth and time-saving application. It also has educational values on inspiring the interest of students to learn and helping the instructors to achieve the objectives of lesson.

This research is a contribution to the quality of education in Arabic language corresponding with the development of education technology. Further research should be carried out either directly or indirectly by those who involved in the study of Arabic language. This is vital to ensure that Arabic language is highly valued and continues to be developed in future.

REFERENCES
Abas, Zoraini Wati. (1993). *Komputer dalam pendidikan.* [Computer in education]. Kuala Lumpur: Penerbit Fajar Bakti Sdn. Bhd.

Ahmad, Ibrahim. (1994). *Perkamusan Melayu: suatu pengenalan*. [Development of Malay language dictionary: an introduction]. Kuala Lumpur: Dewan Bahasa dan Pustaka.

Ahmad, Mohd. Nasaruddin. (1999) Penghasilan dan penilaian satu perisian dan penjana ujian. [The development and assessment of software and examination developer]. Unpublished masters thesis. Faculty of Education, University of Malaya.

Ashaari, Omardin. (1999). *Pengajaran kreatif untuk pembelajaran aktif.* [Creative teaching for active learning]. Kuala Lumpur: Dewan Bahasa dan Pustaka.
Dahan, Hassan Basri. (2005). Daripada tradisi ke inovasi dalam pengajaran bahasa Arab di Malaysia: dilema pelaksanaannya. *Pedagogi merentas kurikulum.* [From tradition to innovation in the teaching of Arabic in Malaysia: implementation dilemma. Pedagogy across curriculum]. 68-78. Bentong: PTS Professional Publishing Sdn. Bhd.
Deraman, A. Aziz. (1994). *Perkamusan Melayu: harapan dan cabaran.* [Malay language dictionary development: hopes and challenges]. Paper presented at Conference of Malay Language Dictionary Development. Co-organized by *Dewan* Bahasa dan Pustaka with Malaysian Linguistic Association on 20-21 Disember 1994.
Education Technology Glossary. (1995). Kuala Lumpur. Dewan Bahasa dan Pustaka. Glosari Teknologi Pendidikan. (1995). Kuala Lumpur: Dewan Bahasa dan Pustaka.
Fewell, Patricia J. & Gibbs, William J. (2003). *Microsoft Office for teachers.* New Jersey: Pearson Education.
Ghazali, Noraziah Ahmad. (2000) *Kecekapan penggunaan kamus ekabahasa dalam meningkatkan pengembangan kosa kata*. [The effectiveness of monolingual dictionary in vocabulary deepening]. Unpublished masters thesis. Faculty of Language and Linguistic, University of Malaya.Fakulti Bahasa dan Linguistik, Universiti Malaya.
Hassan, Nasruddin Mat. (1999). Penggunaan kamus dalam kelas bahasa Melayu dan Inggeris: satu penyelidikan perbandingan. [The use of dictionary in Malay and English language classes: a comparative study]. Unpublished masters thesis. Faculty of Language and Linguistic. University of Malaya.
Kadir, Che Sabariah Abdul. (2002). Pembinaan sistem capaian terjemahan dan tilawah al-Quran tingkatan satu. [Construction of access system for translation and Quran recitation for Form One students]. Unpublished masters thesis. Faculty of Islamic Studies. Universiti Kebangsaan Malaysia.
Karim, Nik Safiah. (1994). Leksikografi Melayu: beberapa perspektif linguistik. Kertas kerja yang dibentangkan dalam *Seminar Perkamusan Melayu*. [Malay lexicography: several linguistics perspectives]. Paper Presented at Conference of Malay Language Dictionary Development. Co-organized by Dewan Bahasa dan Pustaka, and Malaysian Linguistic Association on 20-21 December 1994.
Keong, Tan Choon. (2000). Keberkesanan kaedah arahan berbantukan komputer (CAI) di kalangan pelajar-pelajar tingkatan 4 di Malaysia. [The effectiveness of computer assisted instruction methodology among Form Four students in Malaysia]. Academic Journal. Edition XVIII. Kuala Lumpur: Maktab Perguruan Ilmu Khas Kuala Lumpur.
Lockard, James & Abrams, Peter D. (2004). *Computers for twenty-first century educators.* United States: Allyn and Bacon, Pearson Education, Inc.
Mahmud, Muhammad dan Ahmad, Taufik. (2004). *Instructional Technology.* Amman: Darul Massira.
Mansur , A. M. S. A. (1982). *Ilmu al-Lughatu al-Nafs* [Psycholinguistics]. Riyadh: King Saud University.
Masni Khamis. (2001). *Gaya pembelajaran dan hubungannya dengan pencapaian akademik*. [Learning method and its relationship with academic achievement]. Unpublished research paper. Universiti Kebangsaan Malaysia.
Mohamad, Norma. (2003) Penggunaan kamus Arab-Melayu di kalangan pelajar sekolah menengah. [The use of Arabic-Malay dictionary among secondary school students]. Unpublished masters thesis. Faculty of Language and Linguistic, University of Malaya.
Omar, Irma Idayu & Mansor, Yushiana. (2005). *Panduan mencari maklumat*. [Guidance for information search]. Bentong: PTS Professional Publishing Sdn. Bhd.
Al-Rabi'i, S. M. et. al. (2001). *Al-Mukjam al-Syamil li Mustalahaat al-Hasib al-Aali wa al- Internet* [A complete dictionary for terminologies in computers and internet]. Riyadh: Maktabah al Abikan.
Rashid, Iskandar Ab & Ismail, Zaitun. (2002). *Microsoft Access 2002 langkah demi langkah.* [Microsoft Access 2002 step by step]. Kuala Lumpur: Venton Publishing (M) Sdn. Bhd.
Saad, Rahimi Md. (2003). Penggunaan internet untuk pengajaran dan pembelajaran kemahiran membaca dan menulis bahasa Arab di sebuah universiti. [The use of internet in the teaching and learning of reading and writing in Arabic in a university]. Unpublished masters thesis. Faculty of Education. University of Malaya.
To'aimah, R. A. (1985). *Dalil Amal fi I'dad al-Mawaad al-Ta'limiyah li baraamiji ta'lim al-Arabiayah* [Directory for preparing teaching materials in the Arabic programme]. Mecca: Arabic Language Centre, Ummul Qura University.
Zain, Ismail.(2002). *Aplikasi multimedia dalam pengajaran.* [Multimedia application in teaching]. Kuala Lumpur: Utusan Publications & Distrubution Sdn. Bhd.

THE EFFECT OF ACADEMIC DISCIPLINE AND GENDER DIFFERENCE ON TAIWANESE COLLEGE STUDENTS' LEARNING STYLES AND STRATEGIES IN WEB-BASED LEARNING ENVIRONMENTS

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ABSTRACT
This paper explores students' learning styles in relation to learning strategies in web-based learning environments, and in particular, how academic discipline and gender differences affect learning styles and learning strategies in web-based learning for college students in Taiwan. The results show that regardless of learning strategy, academic discipline or gender, the *visual* type learner is the most dominate learning style for web learners. In addition, *sensing* learners have significantly lower scores in the dimension of *anxiety* than *moderate* learners, which indicates that *sensing* learners feel uneasy in a web-based learning atmosphere, and its related activities. The study also finds that *sequential* learners are more highly motivated than *moderate* and *global* learners, and female learners have higher motivation than male learners in web learning situations. Moreover, students in colleges of liberal arts are less active in web-based learning, as compared with other colleges. Future directions and other related issues are also discussed.

INTRODUCTION
Web-based learning has also shifted traditional face-to-face classroom instruction toward a virtual learning environment. Beyond time and space barriers, web-based learning not only provides a novel learning experience to learners, but it also takes advantage of technology to create a "learners-centered" that emphasizes a learning atmosphere (Powers & Guan, 2000; Simonson, Smaldion, Albright, & Zvacek, 2006). In such a perspective, different from the traditional "teacher-centered" learning setting, web-based learners face a transition of changing familiar methods of learning, and assume an independent role to become self-directed learners (Long, 2003).

Although web-based learning is becoming popular because of its flexibility and convenience, learners could quickly and easily lose their motivation and find that they lack attention to lessons, due to "impersonal, irrelevant, boring, one-size-fits-all page-turners" course designs (Berge & Huang, 2004; Frankola, 2001; Liegle & Janicki, 2006; Moore, Sener, & Fetzner, 2005). O'Connor et al. (2003) surveyed the reasons for dropout statistics of online learning from 400 corporate and academic online students. The major factors behind dropouts are as follows:

- Instructional design-related factors and learning style mismatch (36%);
- Lack of motivation (36%);
- Time conflicts with work and family commitment (33.1%);
- Learning required course materials by the end of the course (25%);
- Lack of organizational support.

Obviously, instructional design and learning styles play critical roles that influence student retention and success in web-based learning (Akdemir & Koszalka, 2008; Moore & Kearley, 2004), which is consistent with Dunn and Dunn (1992) who suggested that if instruction and learning resources compliment learning styles, learners will feel contented and learning will be more effective.

Schemeck (1988) considered learning style as a type of learning strategy, and argued that learning style could be regarded as a tendency to use particular learning strategies in certain situations or learning environments. In other words, the selection of learning strategies should reflect the individual differences of learners. Learning styles and strategies affect student learning and performance (ChanLin, 2009; Ford & Chen, 2000; Weinstein, 1996). Yet, only a few studies involved these two important factors to examine learner behaviors and attitudes in web-based learning, especially on Asian countries (Yip & Chung, 2005). In order to recognize individual differences of learners and create appropriate learning resources and environments, this study examines students' learning styles in relation to learning strategies in a web-based learning environment. Moreover, how academic discipline and gender differences effect learning styles and learning strategies in web-based learning, particularly for college students in Taiwan are also reported.

DEFINITION OF LEARNING STYLES

Learning style is an ongoing issue of great importance to educational research. Kolb (1976) indicated that learning style is a personal method of learning, through the process of learning. Some studies have considered that learning styles are tendencies and preferences (Dunn, 1983), and some consider learning styles are related to individual methods and strategies of information processing (Reid, 1995). McDermott and Beitman (1984) suggested that unique learning styles are learning methods that involve strategies of decision-making, problem solving, etc. According to Keefe (1979), learning styles are generally considered as "characteristic, cognitive, affective, and psychological behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to a learning environment"(p.4). Even though there is various definition of learning styles, which are unique and steady methods of effective learning and information processing is widely accepted (Butler, 1987; Canfield & Canfield, 1988; Keefe, 1991). Obviously, considering the difference of learning environments, learning styles not only affect learning in a traditional face-to-face setting, but it even more importantly influences learner's study in a web-based learning environment (Manochehri & Young, 2006).

RELATED STUDIES IN LEARNING STRATEGIES

Weinstein (1996) pointed out that traditional education has focused on "how to teach", but in the face of a new era, teaching students "learn how to learn" is an even more important issue to discuss. Weinstein mentioned that students must learn how to acquire knowledge, integrate their gained knowledge, and learn problem-solving techniques of higher level thinking, and transfer what they learn to novel tasks. Simply said, "they must become 'strategic learners'" (p. 49). As learning style, learning strategy also play a key role during the entire learning process. Learning style is a relatively stable trait, but allows flexibility of learning strategies, which could be changed when facing various situations or tasks. Learning strategy is different from learning skills. Usually, learning skills could be taught and mastered through practice, yet a skillful person may not be a good strategic learner. A good strategic learner must understand how to identify their learning goal, integrate the learning style, apply proper skills, and be self-regulated to achieve the best results from learning (Paris & Wingrad, 1990; Zimmerman & Schunk, 2001). In fact, for both students and instructors, recognizing learning strategies of students is very critical for improved learning achievements and more appropriate instructional designs (Wadsworth, Husman & Duggan, 2007).

Kauffman (2004) and Whipp and Chiarelli (2004) argued that although students in web-based courses apply some similar learning strategies when facing traditional lectures, they usually face some very unique situations and handle them quite differently. Therefore, facing the challenge of the upcoming demands of increasing web-based learning, it is important to understand how web-based environments affect learning behaviors, and crucial to understand how learning styles and the strategies of learning affect student attitudes toward web-based learning.

METHODOLOGY

In order to investigate students' learning styles in relation to learning strategies in web-based learning environment, a multivariate analysis of variance (MANOVA) was employed to analyze if learners with different learning styles had any effects on their learning strategies. Student's learning styles and learning strategies were used as independent and dependent variables respectively. In addition, using academic discipline and gender as independent variables, and learning styles and strategies as dependent variables, a chi-square test and a one-way of variance analysis (ANOVA) were used to analyze how academic disciplines and gender influenced learning styles and strategies of learners' in web-based learning environments.

Sample

A total of 229 college students from three distance learning courses of distance education, library information literacy, and introduction to computer information participated in this study. Students were asked to fill out both questionnaires of Index of Learning Styles (ILS) and the Learning and Study Strategy Inventory (LASSI) in class, which were retrieved immediately. A total of 203 questionnaires were retrieved, and the retrieval rate was 88%. After the exclusion of 9 invalid questionnaires, 194 remained for data analysis. The valid participants were assembled by the college of liberal arts (N=66), education (N=38), foreign languages (N=33), and management (N=57). 194 students participate to this study, 46 were males (23.7%), and 148 were females (76.3%). Their age were 17 to 24 years old (mean of 19, SD=.82).

Procedure
Two measurements, Index of Learning Style, and Learning and Study Strategy Inventory were asked participants to complete. During face to face classroom period one week before midterm in each class, participants filled out two surveys and collected immediately.

Instruments
ILS and re-phrased ILS. In order to investigate the correlation of learning styles and web-based learning, the instrument has to fit the attributes of the web-based learning. Therefore, the Felder and Soloman Index of Learning Styles (ILS) was selected. Initially, Felder and Silverman (1998) formulated a learning style model that intended to recognize the various significant learning style differences among students, and they believed that the results of measurement would give instructors and instructional designers critical information to approach teaching for learning needs and preferences of students (Felder, 1996).

Based on Felder and Silverman's learning style model, four learning style dimensions, each having two categories: Processing (*active/reflective*), Perception (*sensing/intuitive*), Input (*visual/verbal*), and Understanding (*sequential/global*) are measured in Felder and Soloman ILS (Felder & Soloman, 1999). Felder and Brent (2005) described the categories of the four dimensions, as shown in Table 1.

Table 1. Description of the categories of the four dimensions of learning style model

Dimensions	Relevant preferences
Processing	How does the student prefer to process information?
Active	Learn by trying things out, enjoy working in groups
Reflective	Learn by thinking things through, prefer working alone or with one or two familiar partners
Perception	What type of information does the student preferentially perceive?
Sensing	Concrete, practical, oriented toward facts and procedures
Intuitive	Conceptual, innovative, oriented toward theories and underlying meanings
Input	What type of sensory information is most effectively perceived?
Visual	Prefer visual representations of presented material, such as pictures, diagrams, and flow charts
Verbal	Prefer written and spoken explanations
Understanding	How does the student characteristically progress toward understanding?
Sequential	Linear thinking process, learn in incremental steps
Global	Holistic thinking process, learn in large leaps

ILS is a 44-question instrument, which was created to measure the four dimensions of learning styles of the Felder-Silverman model, and each dimension has associated 11 questions. In the ILS, each answer is either the statement "a" or "b." The method of scoring is to calculate the number of "a" answers and "b" answers separately in the 11 questions of each dimension and to then subtract the smaller number from the larger. Thus, each dimension should show an uneven score with either "a" or "b" predominating and thereby distinguishing the learning style on that dimension. The higher the predominating score, the stronger the preference. The highest score is 11 (a/b), and the lowest score is 1 (a/b).Theoretically, the four dimensions are orthogonal, and all four learning styles should be well established for each individual style, without interference of the other three.

Increasingly, studies have examined learners' attitudes, behaviors, cognitive styles, and learning styles in web-based learning (Papanikolaou, Mabbott & Bull, 2006); however, most learning style inventories are designed for traditional face-to-face learning and learners. To produce more adequate results, this study attempts to re-phrase Felder-Soloman ILS to match the unique nature of web-based learning. For instance, the original item 6 asks: "*If I were a teacher, I would rather teach a course (a) that deals with facts and real life situations; (b) that deals with ideas and theories"*, is re-phrased as: "*If I were an online instructor…*". The original item 11 asks: "*In a book with lots of pictures and charts, I am likely to (a) look over the pictures and charts carefully; (b) focus on the written text"*, is re-phrased as: "*In a webpage with lots of pictures and charts, I am likely to…*". The aim of re-phrasing the original ILS items is to help Taiwanese students refer to their normal behaviors and attitudes toward online learning, and the cultural-friendly translation provides familiar language and terms for the testers. The original Chinese version of ILS was authorized by the North Carolina State University, and translated by Ku and Shen (2009). The Cronbach's coefficient alpha for each dimension of the re-phrased ILS is .68, .71, .75, and .64. According to Tuckman (1999), for the instrument to measure attitude and preference, a .50 Cronbach's alpha value is acceptable for reliability.

Learning and Study Strategy Inventory (LASSI). To measure students' learning strategies, the Learning and Study Strategy Inventory (LASSI) (Weinstein, Palmer & Schulte, 1987) was selected. LASSI is a popular instrument to assess learning strategies (Mealey, 1988; Weinstein, 1988; Olaussen & Braten, 1997; Wadsworth, Husman & Duggan, 2007) and consists of scales to measure attitude, motivation, time management, anxiety, concentration, information processing, selecting main ideas, study aids, self-testing, and test strategies, and it comprehensively reflects the situation of learning and study. Hong (1990) was authorized to translate and modify LASSI into a Chinese version, which has since been extensively used in Taiwan.

In the environment of distance learning, Simonson et al. (2006) pointed out that some characteristics of learners, such as learning attitudes, motivations, anxieties, and information navigation must be considered to insure a successful learning experience. Based on the suggestion of Simonson et al., and for reducing the workload of testers, the current study selected four scales from the Chinese version of LASSI, *anxiety*, *attitude*, *motivation,* and *information processing* to measure and analyze the correlation with learning styles. The Cronbach's alpha values of the original Chinese version: *anxiety .76*, *attitude .72*, *motivation .62,* and *information processing .82* proves that instrument in this study is quite stable and reliable.

FINDINGS AND RESULTS

General description

The result in learning styles showed that the most popular learning style is *visual* (98.45%, 1a~11a), the second is *sensing* (70.1%, 1a~11a), and *verbal* (1.55%, 1b~11b) is the lowest. However, since the four learning style dimensions are independent, a comparison within each dimension is more important than the overall numbers. Therefore, this study rearranged the levels of learning styles as strong tendency (11a~5a and 5b~11b) and moderate tendency (3a~3b) within each dimension. Table 2 presents the distribution of learning style tendencies of all four dimensions. With the exception of *visual* (81.5%) and *verbal* (0.5%) learners, in the other three dimensions, regardless of the comparison of two extremely strong tendencies, moderate learners are the largest group in each dimension. This indicates that visualized presentation styles such as graphics, charts, and motion pictures are highly preferred and accepted by the majority web learners.

Table 2. Learning style distribution of participants (n = 194)

Learning Style	n	%
Processing		
Active (11a~5a)	36	18.6
Moderate (3a~3b)	123	63.4
Reflection (5b~11b)	35	18.0
Perception		
Sensing (11a~5a)	52	26.8
Moderate (3a~3b)	132	68.0
Intuitive (5b~11b)	10	5.2
Input		
Visual (11a~5a)	158	81.5
Moderate (3a~3b)	35	18.0
Verbal (5b~11b)	1	0.5
Understanding		
Sequential (11a~5a)	17	8.8
Moderate (3a~3b)	136	70.1
Global (5b~11b)	41	21.1

In learning strategies, according to the measurement of the four dimensions (*attitude*, *motivation*, *anxiety*, and *information processing*), in the 5-point Likert-type scale, the average score per item of all four dimensions was 3.32. *Information processing* has the highest average score at 3.48. With the exception of the *anxiety* dimension, which scored the lowest at 2.99, the remaining dimensions scored higher than average. The LASSI test results are show in Table 3.

Table 3. Description of LASSI test results

Learning Strategy	M	SD	Ave per/item
Attitude (7 items)	24.34	3.19	3.47
Motivation (7 items)	23.38	3.10	3.34
Anxiety (8 items)	23.95	4.39	2.99
Info. Processing (9 items)	31.36	3.85	3.48
Total (31 items)	103.04	9.20	3.32

Learning styles in relation to learning strategies in web-based learning environments

Using learning styles as an independent variable, and learning strategy as a dependent variable, a MANOVA analysis was conducted to investigate how the three levels of each dimension of learning styles (two extreme sides and moderate) correlate to learners' learning strategies in web-based learning. Since there is no violation of the assumption of variances homogeneity in each dimension (*active/reflection:* Box's M=18.666 F=.892, p=.598>.05; *visual/verbal:* Box's M=8.522 F=.814, p=.615>.05; *sensing/intuitive:* Box's M=30.858 F=1.382, p=.120>.05; *sequential/global:* Box's M=18.112 F=.845, p=.659>.05), the MANOVA was conducted. The MANOVA showed no statistically significant results in *active/reflection* (Wilks' Lambda=.961, F=.933, p=.489>.05) and *visual/verbal* (Wilks' Lambda=.939, F=1.496, p=.157>.05). It indicated that in both *active/refection* and *visual/verbal* learning styles, three level students have no difference in learning strategies. However, the MANOVA showed statistically significant results in both *sensing/intuitive* (Wilks' Lambda=.916, F=2.101, p=.035<.05) and *sequential/global* (Wilks' Lambda=.918, F=2.063, p=.039<.05) dimensions, indicating that at least one of the four learning strategies have significant effects. Scheffe posteriori tests were conducted to examine the significance level of *sensing/intuitive* and *sequential/global* effects on each of the four learning strategy dimensions.

The *sensing* learners (M=22.55) are significantly different from moderate learners (M=24.43) in the dimension of *anxiety* (mean difference =-1.874, p=.032 <.05). It suggested that comparing with the moderate learners, *sensing* learners are more nervous and worry about their learning related activities and situations, such as questioning or testing.

The *sequential* learners (M=25.41) are significantly different from both moderate (M=23.33) and *global* (M=22.70) learners in the dimension of *motivation* (mean difference=2.073, p=.032 <.05; mean difference=2.704, p=.010 <.05), but shows no difference between moderate and *global* learners. The results indicate that *sequential* learners have stronger motivations for their learning related situations than moderate and *global* learners.

The effects of gender and academic disciplines on learning styles in web-based learning environments

Chi-square tests were used to determine whether differences between learning styles and gender and academic discipline are statistically significant. The results of chi-square testing indicated that there are no statistically significant differences, in the four learning style dimensions, due to gender differences: x^2 = 2.1, p=.338 > .05; x^2 = 4.1, p=.125 > .05; x^2 = .3, p=.846 > .05; x^2 = .3, p=.827 > .05. For academic disciplines, the results of chi-square show no statistically significant differences in *sensing/intuitive*, *visual/verbal,* and *sequential/global* are due to academic disciplines: x^2 = 11.3, p=.078 > .05; x^2 = 4.3, p=.225 > .05; x^2 = 6.1, p=.402 > .05, with the exception of *active/reflection*: x^2 = 14.71, p=.023 < .05. A residual analysis was conducted to investigate the correlation between the *active/reflection* dimension and academic disciplines. Table 4 shows that the adjusted standardized residual of *active* learners in a college of liberal arts is -2.4, which is greater than the critical value of 1.96, in absolute value. This indicates that *active* learners in colleges of liberal arts are statistically less significant than the other three colleges. On the other hand, the adjusted standardized residual of *reflection* learners in colleges of liberal arts is 2.1, which is also greater than critical value of 1.96, and indicates that colleges of liberal arts have significantly more *reflection* learners than the other three colleges.

Table 4. Academic discipline x learning style crosstabulation (*Active/Reflection*)

Learning Style			Academic Disciplines (college)				Total
			Liberal Arts	Management	Foreign Language	Education	
	Active	Count	6	14	9	6	35
		Ex Count	12.0	10.3	5.9	6.8	35.0
		% of Total	3.2	7.4	4.7	3.2	18.4
		Adjusted Residual	-2.4	1.5	1.6	-.4	
	moderate	Count	42	34	16	31	123
		Ex Count	41.4	35.7	20.4	23.6	123.0
		% of Total	22.1	17.9	8.4	15.3%	63.7
		Adjusted Residual	.2	-.6	-1.8	1.7	
	Reflection	Count	17	8	7	4	36
		Ex Count	11.6	10.0	5.7	6.6	36.0
		% of Total	8.9	4.2	3.7	1.1	17.9
		Adjusted Residual	2.1	-.8	.6	-.18	
Total		Count	65	56	32	37	194
		Ex Count	65.0	56.0	32.0	37.0	194.0
		% of Total	34.2	29.5	16.8	19.5	100

The effects of genders on learning strategies in web-based learning environments
Independent t-test samples were used to determine if gender differences affect learning strategies. Table 5 shows that Levene's test results (p=.096>.05; p=.076>.05; p=.524>.05; p=.05=.05; p=.507>.05) present no significant level in any of the four learning strategy dimensions, and homogeneity of variance was assumed. Therefore, there was a significant effect on gender, t = -2.527, p=.012 < .05, with motivations of females testing higher than male learners. However, the overall learning strategy showed no significant differences between males and females: t=-.589, p=.557>.05.

Table 5. Analysis of gender differences on learning strategies

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Attitude	EVA	2.791	.096	-1.265	192	.207	-.681
	EVNA			-1.170	67.137	.246	-.681
Motivation	EVA	3.184	.076	-2.527*	192	.012	-1.305
	EVNA			-2.982	102.939	.004	-1.305
Anxiety	EVA	.408	.524	1.509	192	.133	1.115
	EVNA			1.473	72.422	.145	1.115
Information processing	EVA	3.887	.050	-.070	192	.944	-.046
	EVNA			-.080	96.620	.936	-.046
Overall	EVA	.442	.507	-.589	192	.557	-.916
	EVNA			-.590	75.341	.557	-.916

*$p < .05$
[a] EVA = Equal variances assumed; EVNA = Equal variances not assumed

Using colleges as independent variables, and dimensions of learning strategies as dependent variables, a one-way ANOVA was employed to analyze whether academic disciplines affect learning strategies of web learners. There are significant effects for overall learning strategies, F=2.765, p=.043<.05. However, using Scheffe as the posteriori comparisons, there were no statistically significant differences reported, which suggests that academic disciplines do not affect neither the levels of dimensions of learning strategies.

CONCLUSIONS AND DISCUSSIONS

Based on the analysis results, students' learning styles are balanced, and the majority fall into moderate levels, with only *visual* learners dominating *verbal* learners. This may suggest the importance of visuals in web environments, and their effects on the learning habits of the young generation, who seem to feel comfortable navigating cyber space, yet, with *anxiety* showing the lowest score of all four learning strategy dimensions. In particular, *sensing* learners showed significantly higher tendency of anxiety than moderate learners. It indicates that even though students are used to and feel comfortable surfing on the web, web-based learning may be a different story for them. Therefore, how to reduce student anxiety on web-based learning environment to enhance their learning is a critical issue for continued discussion.

Sequential learners have significantly higher motivation scores than moderate and *global* learners. Felder and Soloman (2001) mentioned that regardless the performances, *sequential* learners seem work harder than *global* learners. According to the results of the study, females have significantly higher motivation scores than male learners. Ross and Powell (1990) pointed out that females have higher motivation and are more self-directed than males in learning. Females seem willing to spend more time reading, preparing presentations, and completing assignments. For scholarly degrees, academic credits, and even peer relationships, females take these issues more seriously than males, thus, females have higher completion rates than male in web-based learning (Simonson et al., 2006; Chen & Tsai, 2007)

Although the study showed no significant academic discipline differences in *sensing/intuitive*, *visual/verbal*, and *sequential/global* learning styles, in colleges of liberal arts, *active* learners are significantly less than other colleges. Therefore, providing a collaborative learning environment, such as web 2.0 strategies or group/team projects to encourage and reinforce interaction in learning may benefit liberal arts students.

Obviously, investigating the correlation in learning styles and learning strategies is critical. However, this important issue related to web-based learning has few previous studies for reference. In order to provide further information on this issue, increasing sample size is necessary, especially if colleges are also increased. Although previous studies have suggested that learning style is a steady preference for learners, it could be adjusted through training and practice. Therefore, measuring the same group of students, test them in their freshman year, then retest them in their junior and senior year, may reveal clear tendencies of their learning styles and strategies if it can be affected by training and practice.

In addition, following the essential modifications mentioned above, exploring the other dimensions of learning strategies, such as time management and testing strategies are also very important for future studies. Moreover, adapting some related variables, such as instruction methods or satisfaction of instruction, could be further investigated for better understanding of students' learning behaviors in web-based learning environments.

REFERENCES

Akdemir, O., & Koszalka, T. A. (2008). Investigating the relationships among instructional strategies and learning styles in online environments. *Computers & Education, 50*(4), 1451-61.

Berge, Z. L., Huang, Y. (2004). A model for sustainable student retention: A holistic perspective on the student dropout problem with special attention to e-Learning. american center for the study of distance education, Deosnews, 13:5. Retrieved November 19, 2009, from http://www.ed.psu.edu/acsde/deos/deosnews/deosnews13_5.pdf

Butler, K. A. (1987). *Learning and teaching style: In theory and practice*. Columbia, CT: Learner's Dimension.

Canfield, A. A., & Canfield, J. S. (1988). *Canfield instructional styles inventory (ISI) manual*. Los Angeles: Western Psychological Services.

ChanLin, L. J. (2004). Use of learning strategies in web-based project tasks. *Proceedings of the World Conference on Educational Multimedia, Hypermedia & Telecommunications*, *ED-MEDIA 2009*, 1677-1682.

Chen, R., & Tsai, C-C. (2007). Gender differences in Taiwan university students' attitudes toward web-based learning. *Cyberpsychology & behavior, 10*, 645-54.

Dunn, R. (1983). Can students identify their own learning style? *Educational leadership, 40*(5), 60-2.

Dunn, R., & Dunn K. (1992). *Teaching elementary students through their individual learning style-practical approaches for grades 3-6*. Massachusetts: Simon & Schuster.

Felder, R. M. (1996). Matters of style. *ASEE prism, 6* (4): 18-23.

Felder, R. M., & Brent, R. (2005). Understanding student differences. *Journal of Engineering Education, 94*(1), 57-72.

Felder, R. M., & Silverman, L. K. (1998). Learning and teaching styles in engineering education. *Journal of engineering education, 78*, 674–81.

Felder, R. M. & Soloman, B. A. (2001). Index of learning styles questionnaire. Retrieved August 20, 2007, from http://www.engr.ncsu.edu/learningstyles/ilsweb.html

Felder, R. M., & Soloman, B. A. (1999). Index of learning styles. Retrieved August 20, 2009, from http://www2.ncsu.edu/unity/ lockers/users/f/felder/public/.

Ford, N., & Chen, S. (2000). Individual differences, hypermedia, navigation, and learning: An empirical study. J*ournal of educational multimedia and hypermedia 9*, 281 – 311.

Frankola, K. (2001). Why online learners drop out. *Workforce, 80*:53–58.

Hong, B-L. (1990). *A study of College students' learning and modification of LASSI*. Unpublished master's thesis, NCUE, Changhua, Taiwan.

Kauffman, D. E. (2004). Self-regulated learning in Web-based environments: Instructional tools designed to facilitate cognitive strategy use, metacognitive processing, and motivational beliefs. *Journal of Educational Computing Research, 30*(1/2), 139-61.

Keefe, J. W. (1979). Learning style: an overview in J. W. Keefe (Ed.), *Learner learning styles:diagnosing and prescribing programs NASSP*, Reston.

Keefe, J. W. (1991). *Learning style: Cognitive and thinking skills*. National Association of Secondary School Principals, Reston, VA

Kolb, D. (1976). *Learning style inventory: Technical manual*. Boston: McBear and Co.

Ku, D. T., & Shen, C-Y. (2009).Reliability, validity and investigation of the Index of Learning Styles in a Chinese language version for late adolescent of Taiwanese. *Adolescence*, *44*, 827-850.

Liegle, J. O. & Janicki, T. N. (2006). The effect of learning styles on the navigation needs of web-based learners. *Computers in Human Behavior, 22*, 885-98.

Long, H. B. (2003). Preparing e-learners for self-directed learning. In G. M. Piskurich (Ed.), *Preparing learners for e-learning. San Francisco*, CA: Pfeiffer.

Manochehri, N., & Young, J. I. (2006). The impact of student learning styles with web-based learning or instructor-based learning on student knowledge and satisfaction. *The quarterly review of distance education, 7*(3), 313-316.

McDermott, P. A., & Beitman, B. S. (1984). Standardization of a scale for the study of children's learning styles: Structure, stability, and criterion validity. *Psychology in the schools, 21*(1), 5-14.
Mealey, D. L. (1988). Test review: Learning and study strategies inventory (LASSI). *Journal of reading, 31*(4), 382-5.
Moore, M. G., & Kearley. G. (2004). Distance education with infotrac: A systems view.(2nd ed.). Wadsworth Publish.
Moore, J. C., Sener, J. & Fetzner, M. (2005). Getting better: ALN and student success. Retrieved November 10, 2009, from http:// www.sloan-c.org/publications/jaln/v10n3/pdf/v10n3_6moore.pdf.
O'Connor, C., Sceiford, E., & Wang, G. (2003). Departure, abandonment and dropout of e-learning: dilemma and solutions. Masie center and e-learning consortium. Retrieved October 5, 2009, from www.masie.com/researchgrants/2003/JMU_Exec_Summary.pdf.
Olaussen, B. S., & Braten, I. (1997). Identifying latent variables measured by the Learning and Study Strategies Inventory (LASSI) with Norwegian college students. *Journal of experimental education, 67*(1), 82-96.
Papanikolaou, K. A., Mabbott, A., & Bull S. (2006). Designing learner-controlled educational interactions based on learning/cognitive style and learner behavior. *Interacting with computers, 18*(3), 356-84.
Paris, S. G., & Winograd, P. (1990). Promoting metacognition and motivation of exceptional children, *Remedial and Special Education, 11*, 7-15.
Powers, S. M., Guan, S. (2000). Examining the range of student needs in the design and development of a web-based course. In B. Abbey (Ed.), *Instructional and cognitive impacts of web-based education*. PA: Idea Group Publishin
Reid, J. M. (1995). *Learning styles in the ESL/EFL classroom*. Florence, KY: Heinle & Heinle Publishers.
Ross, L. R., & Powell, R. (1990). Relationships between gender and success in distance education courses: a preliminary investigation. *Research in distance education, 2*(2), 10-11.
Schmeck, R. R. (1988). Strategies and styles of learning: An integration of varied perspectives. R. R. Schmeck, (Ed.), *Learning strategies and learning styles*, New York: Plenum Press.
Simonson. M., Smaldino, S., Albright, M., & Zvacek, S. (2006). *Teaching and learning at a distance: foundations of distance education*. New York; Prentice Hall.
Tuckman, B. W. (1999). *Conducting educational research* (5th ed.). Belmont, CA: Wadsworth Group.
Wadsworth, L. M. , Husman, J., & Duggan, M. A. (2007). Online mathematics achievement: Effects of learning strategies and self-efficacy. *Journal of Development Education. 30*(3), 6-14.
Weinstein, C. E. (1996). Learning how to learn: An essential skill for the 21st century. *The educational record, 77*(4), 49-52.
Weinstein, C. E. (1988). Executive control processes in learning: Why knowing about how to learning is not enough. Adapted from an invited address presented at annual meeting of national association for developmental education, Orlando, FL.
Weinstein, C. E., Palmer, D. R., & Schulte, A. (1987). *Learning and study strategy inventory*. Clearwater, FL: H & H Publishing.
Whipp, J, & Chiarelli, S. (2004). Self-regulation in a Web-based course: A case study. *Educational technology research and development, 52*(4), 5-22.
Yip, M. C. W., & Chung, O. L. L. (2005). Relationship of study strategies and academic performance in different learning phases of higher education in Hong Kong. *Educational research and evaluation, 11*(1), 61-70.
Zimmerman, B, J, & Schunk, D. H. (2001). *Self-regulated learning and academic achievement: Theoretical perspectives* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.

THE EFFECT OF USING COMPUTER ANIMATIONS AND ACTIVITIES ABOUT TEACHING PATTERNS IN PRIMARY MATHEMATICS

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ABSTRACT

In this study it is investigated that teaching of different pattern types by using computer animations and activities. The sample of this study was 28 eighth grade students in second semester of 2010-2011 educational years. They are at public school in Ankara. The one group pre-test post-test design was used for research methodology. Data were collected by pre-test and post-tests which were developed by researchers and it was revised in terms of reliability and administered to the students. The subject was showed by using computer to the students after pre-test. At the end of the teaching, that achievement test was applied on the group as the post-test. For data analysis, quantitative methods were used. According to the findings; academic performance of the students increased by using computer animations and activities about patterns. Also, it is found that there was a significant difference between academic performances of students about different pattern types.

INTRODUCTION

Mathematics, which is known to improve thinking, is one of the most important devices. As it is known, the basic property which distinguishes humans from other living beings is the ability to think, making inferences and rearranging condition suitable to him (Umay, 2003). Mathematics is a science which has application in science, technology and in all other sciences, and mostly it is called a science of order and pattern. It doesn’t mean numbers and operations carried out with them (Yaman, 2010). A sub-branch of mathematics which we confront in nature, art, environment and in many other areas is geometry. Geometrical shapes and objects which have an important place in human life are encountered frequently in daily life. When we look around there are a quite a lot of geometrical shapes, patterns and structures in the good we use (Gürbüz, 2008).

The pattern concept encountered prevalently in daily life has started to be given at primary education level. Pattern concept which takes place in primary education mathematics curriculum, especially at the levels of 6th, a 7th and 8th grade is given with different presentation forms.

Especially given the level of primary education algebra means that abstract and fight for students (Willoughby,1997). The education of algebra that began in the 7th grade with the Mathematical Curriculum, changed in 2004, begins to be given from the first years of primary school with the new programme. Among the subgroups of algebra, patterns and tessellations subject, which is appropriate for the level of students and more concrete, take place in the first step of the primary school in the Mathematics Programme. With the help of this subject, students can make generalizations by seeing concrete models. How the pattern will be presented is as important as the pattern concept itself, taking place in the Mathematics Programme and also significant for mathematical thinking. When the studies are examined, it is seen that the achievements of the students with different presentations about patterns has been examined but the 8th grade students’ hasn’t been yet. For this reason in this study, the achievements of the 8th grade students with different presentations about patterns are compared. In the comparison it is determined that in which presentation students are more successful.

In mathematics teaching, students have difficulty in especially abstract subjects such as algebra. As well as the subjects, teaching methods and techniques applied on the students for these subjects cause that they are seen as difficult and impossible to understand. In order to make the students like mathematics and increase their academic achievement, it is necessary to notice them the enjoyable and usable sides of mathematics in daily life. This helps students break their prejudice. Among the subgroups of algebra, patterns and tessellations subject, taking place in mathematics curriculum especially from the first years of the primary school, and the way of their presentations can also help the students break this prejudice. The students can see different ways of the subjects with different presentations of the same question and learn the subject suitably for their own level. With this study it is aimed that in which presentation of patterns students get the relation between the numbers better and make generalizations easily. Nonetheless, it is thought that this study will be a leading for the new mathematics curriculum.

Early grades, algebraic notation can play a supportive role in learning mathematics (Carraher, Schliemann, Brizuela & Earnest, 2006). It is clear that algebraic thinking is a particular form of reflecting mathematically (Radford, 2006). The National Council of Teachers of Mathematics (NCTM, 2000) recommends that the development of algebraic reasoning begin with experiences with patterns and relationships in Grades K-2, incorporate variables and expressions in Grades 3-5, and focus on analysis, representations, and generalisations of functional relationships in Grades 6-8. Number patterns, the relationship between variables and generalisation are considered important components of algebra curricula reform in many countries (Samsan, Linchevski & Olivier, 1999). Children, from a very early age, love colouring patterns and Islamic patterns may be utilized introduce symmetry at the tender age of 3 or 4. At the university level, the patterns may be used to teach transformation geometry (Abas, 2004). A major learning goal for students in the primary grades is to develop an understanding of properties of, and relationships among, numbers (NCTM, 2000). Children's thinking processes in generalisation reports on children's strategies in abstracting number patterns and formulating general relationships between the variables in the situation (Orton and Orton, 1994). The relationship which is called functional relationship begins with the notion of patterns in early grades, develops gradually in algebraic thinking process, and gains the abstract manner with the function notion (Kabael, Tanışlı, 2010).

From the national survey, reasoning on geometric number patterns is a proper initial activity for learning algebraic thinking in Grade 7 (Lin, Yang, 2006). The study of patterns' generalization in school mathematics has been the focus of research conducted over the last years. Many researchers have made some attempts to investigate stages or levels in the development of patterning ability mainly focused on students' ability to generalize (Cruz, Martinon, 1998). Some definitions are in order here by Bishop (2000),

> *"A number pattern is a sequence of numbers in which there is a well-defined rule for calculating each number from the previous numbers or from its position in the sequence. In a geometric number pattern, the numbers relate to a sequence of geometrical figures in which each figure is derived from the previous figure by some well-defined procedure. A number or geometric number pattern is linear if each number is obtained by adding a constant increment to the previous number or, equivalently, if each number is a linear function of its position in the sequence."*

Past research has indicated that children tend to have a propensity to look for the additive strategy (look down the table) when searching for patterns in tables of values (Warren, 1996). Children try to construct simple multiplication (proportional) structures, but when it does not fit the database, they quickly give up and then invent all kinds of error-prone recursion strategies. In all activities where students identified a function rule, most of them described their rule in words rather than using symbols (Samsan, Linchevski and Olivier, 1999). Experiences with a variety of patterns help students recognize order and make predictions. Creating patterns gives students opportunities to describe what is being repeated or how the pattern grows and to explain what should come next (NCTM, 2000).From 2000 to 2005, close to 70,000 students in the US Bay area participated in open-ended assessment that involved generalizing linear patterns. Five years of data collection and analysis of 8th grade students' work have shown that while 72% of those tested could successfully deal with particular cases of linear patterns in visual and tabular form, less than 18% of them could use algebra to express correct relationships or to generalize to an explicit, closed formula (Rivera & Becker, 2006).

As students work with multiple representations of number and with counting, their knowledge of number concepts grows more sophisticated. As students have repeated experiences with patterns, they will be able to make and investigate conjectures about counting sequences (NCTM, 2000).

The Study

In this research;

.● Is reminding has an effect, according to presentation styles of 8^{th} grade students, in their performances with mathematical patterns by using computers?

● Is there a significant relationship between performances regarding mathematical patterns according to presentation styles of patterns at the reminding in 8^{th} grade students by using computer?

questions will be answered.

The experimental study was carried out at a primary school in 8^{th} grade class belonging to National Education Ministry in Ankara. We worked with 28 eighth-grade students (11 boys, 17 girls, mean age of 13) in an urban school in Ankara. Prior to application a pretest comprising 6 questions prepared by scientists was applied to the students. The questions were prepared by using three different presentation styles from linear increasing patterns (shape, number sequence, and table). While the validity of the questions were provided by taking expert opinions, the reliability coefficient was found as α =.8905. Reliability coefficient of achievement tests being more than 0.70 is a significant reliability level (DeVelles, 1991). The result of the analysis show the level of validity and reliability was high for pattern subject of mathematics lesson. The application was carried out for four hours with 28 students in the 8^{th} grade in a primary school chosen for the application. In the first lesson pre-test was applied. Students knew pattern presentation styles which could be shown in three different ways comprising shape, number sequence and table.

During the application students were educated for two hours by using computer in a way to remind presentation shapes (figure–1). The presentations which were used during the application were prepared by the scientists in accordance with the curriculum by scanning necessary literature. Different examples belonging to three different presentation styles were solved with the students and the application was completed and following this a post test was applied.

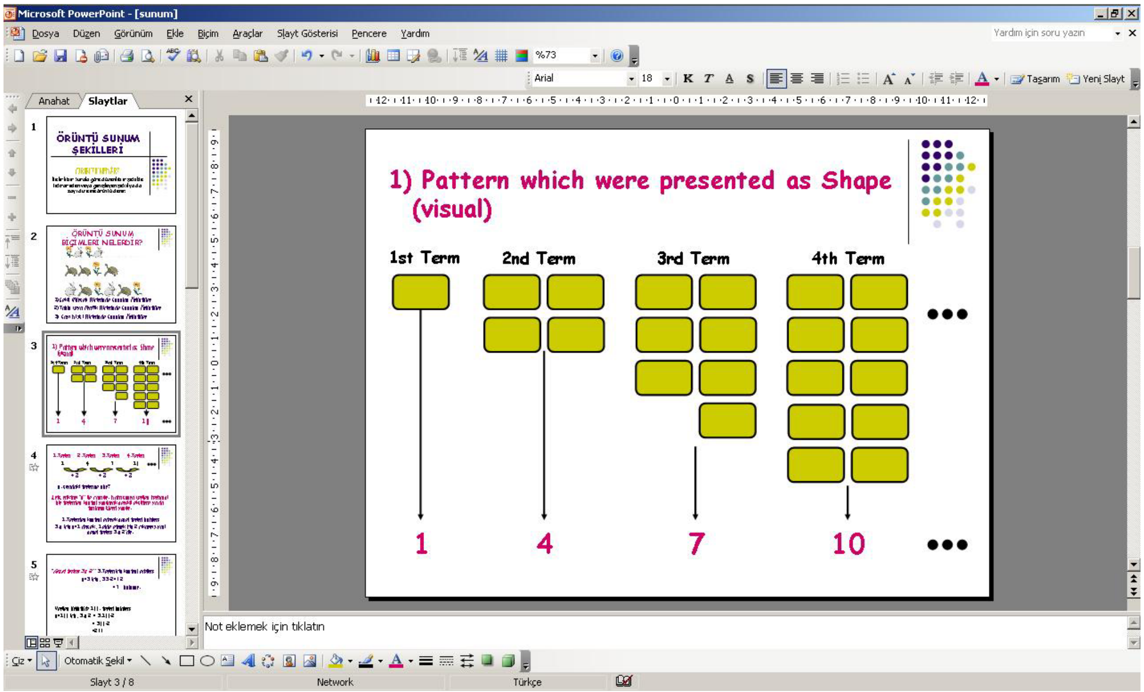

Figure – 1: The example belonging to the presentation used in the application

FINDINGS

In this section, in order to answer the research questions, statistical analysis administered and the findings about research, the comments based on these findings, are mentioned. In order to find an answer for the first question in the research, it is analyzed if there is a significant difference between pre-test and post-test marks of the groups on whom they made application. The students' pre-test and post-test average marks they take from the achievement test about patterns in Math lesson, standard deviation values, and results of paired sample t-test are such as in table-1.

Table-1: The Paired Sample T-Test Results about Pre-Test and Post-Test Average Marks

Measurement	N	$\bar{x}$	S	df	t	p
Pre-test	**28**	**2.21**	**2.347**	**27**	**-4.500**	**.000**
Post-test	***28***	***4.79***	***1.371***			

After the reminders with using computer, students' academic achievement has a significant increase in pattern lesson [t_{27}=-4.500, $p<.01$]. As the average of the true answers, that the students give before the applications, is $\bar{x}$ = 2.347, this average increases to $\bar{x}$ = 4.79 after two-hour application with computer. This finding shows that the reminder, made by computer, has a significant effect on increasing the academic achievement of the 8th grade students in linear increased pattern.

In order to find an answer for the second question in the research, by looking the post-test marks of the group, it is analyzed if there is a significant difference between their academic achievements according to the pattern presentations. The questions in the achievement test are grouped as set of number presentation style, figure presentation style and form presentation style, and the difference between these groups are compared. The average post-test marks of 28 students, in the application, according to different presentation styles of patterns' achievement test in Math lesson, their standard deviation values and *simple factored ANOVA* results of the paired sample are such as in table-2.

Table-2: Post -Test Marks' ANOVA Results According To Pattern Presentation Styles

Variance Source	Total Squares	df	Average Squares	F	p	Significant Difference
Intersubjects	16.905	27	0.626			
Measurement	3.167	2	1.583	10.469	.000	1-2,1-3
Mistake	8.167	54	0.151			
Total	28.239	83				

1-Form presentation style, 2-Figure presentation style, 3-Number sequence presentation style

It is found a significant difference between set of form, number and figure from the students' pattern presentation styles [$F_{2\text{-}54}$=10.469, p<.01]. Figure presentation style mark ($\bar{x}$ = 1.7143) and set of number presentation style mark ($\bar{x}$ = 1.7500) are higher than form presentation style mark ($\bar{x}$ = 1.3214). On the other hand the difference between figure presentation style and number sequence presentation style is not seen as significant.

The finding shows that the students are more successful with the figure presentation and number sequence presentation style than that of form presentation style.

CONCLUSIONS

In this section, it is mentioned about the results, reached by the findings and comments of the research said before, the arguments about these results and suggestions developed by the results. In this study, the achievements of the 8th grade students with different presentations about patterns are compared after the reminders made by using the computer aided teaching. In the comparison it is determined that in which style of presentation students are more successful. When the data, obtained by this aim, is examined, those results are reached: According to the pre-test results, made before the application, a significant difference isn't seen between the academic achievements of the students with different presentations about patterns.

At the end of this research, it is appeared that the reminders, made by using the computer aided teaching, are effective in increasing the achievements of the students about the patterns and tessellations in mathematics. This result shows that computer aided teaching has positive effects on the achievements of the students and also supports different studies determining that computer aided teaching increases the students' achievement in different teaching levels and subjects. In the research, Akçay supports the studies those of Tüysüz and Feyzioğlu's Science lesson in the 8th grade (2003), of Ebenezer's Chemistry lesson (2001), of Yenice's Primary School Science lesson (2003), and of Sulak's Primary School Mathematics lesson in the 6th grade. The research above, displays that computer aided learning method has a positive effect on the students' achievements and the findings of the research are parallel with them.

In conclusion, people encounter with computer almost everywhere in Turkey. It is unavoidable for computer to be used while it is commonly preferred by everyone. Enabling active participation and addressing more than one feeling at the same time, computer makes the learning states more dynamic and colourful. Because of all these reasons, it is thought that computer aided teaching can be used effectively with many lessons including even mathematics.

This research is one of the few research made about computer aided teaching in Primary School Mathematics in Turkey. According to the research results, the suggestions for the Mathematics teachers, classroom teachers, and the corporations growing up teachers, program developers and researchers studying on this section are: in primary school level, computer aided learning method can be used more in mathematics lessons according to learning areas.

Computer aided learning method, used in the research, can be tried on different class levels and different subjects in mathematics lesson and then the results can be evaluated. The problems that the mathematics teachers, using computer aided learning method, encountered at the time of the applications, can be studied.

REFERENCES

Abas, S., J. (2004). Islamic Geometrical Patterns for the Teaching of Mathematics of Symmetry. *The EDL is sponsored by the National Science Foundation as a part of the National STEM Digital Library* (www.nsdl.org).

Bishop, J. (2000). Linear Geometric Number Patterns: Middle School Students' Strategies. *Mathematics Education Research Journal*, Vol. 12, No. 2, 107-126.

Büyüköztürk, Ş. (2002). *Sosyal Bilimler için Veri Analizi El Kitabı, İstatistik, Araştırma Deseni, SPSS Uygulamaları ve Yorum.* 2. Basım, Pegem A Yayıncılık.Ankara

Carraher, D., W., Schliemann, A., D., Brizuela, B., M., Earnest, D. (2006). Arithmetic and Algebra in Early Mathematics Education. *Journal for research in Mathematics Education*, Vol. 37, No: 2, 87 – 115.

Cruz, J., A., G., Martinon, A. (1998). Levels of Generalization in Linear Patterns. *Proceeding of the 22nd Conference of the International Group for the Psychology of Mathematics Education*, Vol 2, pp 329-336.University of Stellenbosch. Stellenbosch, South Africa.

DeVelles, R., F., (1991). *Scale Development: Theory and Applications.* London: SAGE Publications.

Lin, F., L., Yang, K., L. (2004). Differentiation of Students' Reasoning on Linear and Quadratic Geometric Number Patterns. *Proceedings of the 28th Conference of the International Group for the Psychology of Mathematics Education, Vol* 4 pp 457–464.

Gürbüz, K. (2008). İlköğretim Matematik Öğretmenlerinin Dönüşüm Geometrisi, Geometrik Cisimler, Örüntü ve Süslemeler Alt Öğrenme Alanlarındaki Yeterlikleri. *Abant İzzet Baysal Üniversitesi Sosyal Bilimler Enstitüsü*. Yüksek Lisans Tezi.

Kabael, T., Tanışlı, D. (2010). Teaching from Patterns to Functions in Algebraic Thinking Process. *Elementary Education Online, 9(1), 213-228, 2010 .İlköğretim Online, 9(1), 213-228, 2010.* [Online]: http://ilkogretim-online.org.tr.

Luis Radford, (2006). Algebraic Thinking and the Generalization of Patterns: a Semiotic Perspective. *PME-NA. Proceedings, Plenary Sessions*, Vol.1-3.

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics.* Reston, VA: Author.

Orton, A. ve Orton, J. (1994). Student's perception and use of pattern and generalization. *Proceedings of the Eighteenth Conference for Psychology of Mathematics Education*, s. 407-414.

Becker, J., R., Rivera, F. (2006). Sixth Graders' Figural and Numerical Strategies for Generalizing Patterns in Algebra (1*). Vol.2-95. PME-NA 2006 Proceedings.*

Samsan, M. C., Linchevski, L. ve Olivier, A. (1999). The Influence of Different Representations on Children's Generalisation Thinking Processes. *Proceedings of the Seventh Annual Conference of the Southern African Association for research in Mathematics and Science Education*. Harare, Zimbabwe. 406-415.

Umay, A. (2003). Matematiksel Muhakeme Yeteneği. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 24, 234–243.

Warren, E. (2005). Patterns Supporting the Development of Early Algebraic Thinking. In P. Clarkson, A. Downton, D. Gronn, M. Horne, A. McDonough, R. Pierce, & A. Roche (Eds.), *Building connections: Research, theory and practice (Proceedings of the 28th annual conference of the Mathematics Education Research* Group of Australasia, Melbourne, s. 759-766). Sydney: MERGA.

Willoughby, S.S. (1997). Functions from kindergarten through sixth grade*.* *Teaching Children Mathematics*, 3, 314-318.

Yaman, H. (2010). İlköğretim Öğrencilerinin Matematiksel Örüntülerdeki İlişkileri Algılayışları Üzerine Bir İnceleme. *Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü İlköğretim Anabilim Dalı, Doktora Tezi.*

THE EXAMINATION OF ONLINE SELF-REGULATED LEARNING SKILLS IN WEB-BASED LEARNING ENVIRONMENTS IN TERMS OF DIFFERENT VARIABLES

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ABSTRACT
The purpose of this research is to determine whether online self-regulated learning skills differentiate student attitudes towards the internet and web-based education in web-based learning environments. Following survey method of research, the results were presented in descriptive manner. 169 university students participated in the study group. The data of this research were collected by using the Online Self-Regulated Learning Scale (α=0.94), Attitudes toward the Internet Scale (α=0.77), Web-Based Learning Attitude Scale (α=0.86) and Computer Attitude Scale (α=0.97). Percentage, frequency, arithmetic average, t and the Pearson's r correlation statistics were employed on the collected data. The results suggested three major findings (1) online self-regulated learning skill levels affect attitudes of students towards the internet, (2) online self-regulated learning skill levels differentiate student attitudes towards web-based education in terms of the factor of the "Effectiveness of Web-Based Instruction", and (3) online self-regulated learning skill levels differentiate attitudes of students towards computer.
keywords: Web-based learning, self-regulated learning, computer, internet, attitude

INTRODUCTION

It can be argued that rapidly starting to use information and communication technologies in education, as it brings along different concepts, brings about people to need more skills to be able to keep up with developing technology and in this case, computer use leads to an inevitable necessity in terms of both individual and social rationales. Besides the fact that computers motivate students effectively, support life-long learning and increase flexibility in education programs can be said as principle reasons of computer usage (Keser, 1988; Alkan, 1997). On the other hand, today, learning is regarded as a concept that can emerge not only in schools and specific centers but also in all kind of environments and every phase of life (Reigeluth, 1999).

One of the most fundamental ways to gain these skills to people that they need in the name of increasing their quality of life not only in schools but also in any place or time is of course web-based education, which is the fastest proliferating type of distance education (Imel, 1997; Perraton, 1998). Web-based education presents many opportunities to students such as being able to access course material when and where they can access internet and to communicate with other students synchronous and asynchronous modes (Aase, 2000). The use of online communication devices in educational environments gained quite significance with the increase of internet use and the usage of computer and internet-supported communication channels became important in increasing level of interaction. These communication channels can present environments to instructors and students, where both synchronous and asynchronous technologies can be used.

There may be plenty of factors for web-based education to be able to become successful. One of them is self-regulated learning skills. Self-regulated learning, which refers to an active and constructive process when individuals attempt to adjust their behaviors, supra-cognitive competency and motivation towards learning goals they introduce, limit their goals by guiding with respect to environmental influences, can be said to possess an important function in developing life-long learning skills (Pintrich, 2000; Zimmerman, 2002; Wirth & Leutner, 2008). Many studies conducted on self-regulated learning put forward that there is a positive significant relationship between students' motivation levels and learning strategies that they use and academic accomplishments (Pintrich & De Groot, 1990; Zimmerman & Martinez-Ponz, 1990; Butler & Winne, 1995; Ley & Young, 1998; Chung, 2000). These findings led to the concept of self-regulation to be on the rise and politicians, who guides education in distinct countries, and educational psychologists to regard self-regulation as a key to success (Boekaerts, 1999).

According to Zimmerman (1994), students who use self-regulated learning skills effectively possess three significant qualities. The first one is that they use various cognitive strategies that will assist to configure knowledge and keep it in mind. The second one is that they actively control their own learning by employing supra-cognitive strategies such as planning and observation to control their progress. The last one is that they concentrate on their lessons by self-motivating and solve emotional adversities reasonably (Miltiadou & Savenye, 2003). Online learning environments considerably decreasing the restrictions of place, time and physical materials give students control regarding when, how and what they study (Cunningham & Billingsley, 2003). Considering attributes of students possessing self-regulated learning skills and student autonomy, which is one of the distinguishing characteristics of online learning environments, self-regulated learning is seen to be an important variable in terms of success in online learning environments (Ally, 2004; Hodges, 2005; Fisher & Baird, 2005; Kitsantas & Dabbagh, 2010). The positive correlation between self-regulated learning and academic accomplishment in online and blended learning environments emerged in conducted studies displays this importance (McManus, 2000; Lynch & Dembo, 2004; Chang, 2007).

In terms of web-based education to be able to provide sufficient contribution to academic accomplishment, in addition to self-regulated skills, it can be said that students' attitudes directed to web-based education, computer and internet are important. Attitude is defined as "considerably organized long-term sensation, faith and behavior tendency" (Cuceloglu, 1998). Khine (2001) describes attitude as a mental preparation condition that affects people's stances against a situation and formed as a result of their lives. Ozgur and Tosun (2010) denote that attitudes directly affect success in web-based education and it is quite important to appropriately meet student expectations and requirements in time in terms of their accomplishments.

The purpose of this research is to determine whether online self-regulated learning skills differentiate students' attitudes towards computer, internet and web-based education. In this context, questions below were sought an answer:

1. How are the self-regulated learning skill levels of students in online environments?
2. Is there a correlation between students' online self-regulated learning skills and attitudes toward internet?
3. Is there a correlation between students' online self-regulated learning skills and attitudes toward web-based education?
4. Is there a correlation between students' online self-regulated learning skills and attitudes toward computer?
5. What kind of a relationship exists between student attitudes towards web-based education and computer and internet?

METHOD

Research is of a descriptive character. It was conducted in the survey model. In this context, online self-regulated learning skills of students in web-based learning environments were attempted to be determined within the framework of their attitudes towards internet and web-based education.

Working Group

169 students in total in five departments receiving the course of Computer II in the form of web-based instruction practice in the Departments of Elementary Education, Science, and Social Studies Teaching in the Faculty of Education of Ahi Evran University during 2010-2011 spring semester constitute the working group of this research. The distribution of students with respect to gender and groups is summarized in Table 1.

Table 1. The distribution of Students with Respect to Gender and Groups

Groups	Female	Male	Total
Science Education	70	36	106
Social Science Education	41	22	63
Total	**111**	**58**	**169**

Data Collection Instruments

The data of this research were gathered using Online Self-Regulated Learning Scale, Attitudes toward Internet Scale, Web-Based Learning Attitude Scale and Computer Attitude Scale. The details concerning scales are as follows:

a. Online Self-Regulated Learning Scale: Self-regulated learning skills of students in online environments were collected by using Online Self-Regulated Learning Scale designed by Barnard et al. (2009) and whose original name is "Online Self-Regulated Learning Questionnaire (OSLQ)". The scale developed by Barnard et al. (2009) consists of six factors and 24 items in total. The validity and reliability study of the scale was performed separately in two distinct study groups as consisting of students, who received education in both blended learning and online learning environments. Confirmatory factor analysis was carried out to determine structure validity in both applications. Parameters in both applications point to its acceptable fit for this structure with 6 factors. Turkish adaptation of the scale was made by Korkmaz and Kaya (in press). Researchers employed confirmatory factor analysis to test structure validity of the scale in Turkish culture. Accordingly, model goodness of fit values of the scale were found as [$\chi 2$ (d=227, N=222) = 327, 28, p<.01, RMSEA= 0.045, S-RMR= 0.047, GFI= 0.89, AGFI= 0.85, CFI= 0.99, NNFI= 0.99, IFI= 0.99]. Accordingly, other observed values of model except GFI and AGFI indicate that the data is perfect and for these two values, it exhibits acceptable fit. Internal consistency coefficient of the scale was tested by Cronbach's alpha reliability coefficient and designated as 0.948. On the other hand, Cronbach's alpha values regarding factors are seen to vary between 0.632 and 0.941.

b. Attitudes toward Internet Scale: "Attitudes toward Internet Scale", whose reliability and validity studies were performed developed by Tavsancil and Keser (2001), was employed to measure student attitudes toward internet. The scale, which is 5-point Likert scale, consists of 25 items and 5 factors. Five factors explain 55.381% of total variance. The first 10 items in the scale are negative and the rest 15 are positive. Negative items were coded inversely. According to analyses conducted by Tavsancil and Keser (2001), the internal consistency coefficient (Cronbach α) of the first factor denominated as "Denying Internet" is 0.87, the internal consistency coefficient of the second factor consisting of 4 items and denominated as "Trust Internet" is 0.72, the internal consistency coefficient of the third factor consisting of 4 items and denominated as "Believing Internet's Benefits" is 0.72, the internal consistency coefficient of the fourth factor consisting 4 items and named as "Believing the Benefit of Internet" is 0.71 and the internal consistency coefficient of the last factor consisting of 3 items and named as "Enjoying Possibilities that Internet Offers" is 0.77. The internal consistency coefficient for the whole scale was estimated as 0.79.

c. Web-Based Learning Attitude Scale: "Web-Based Learning Attitude Scale", whose reliability and validity studies were performed developed by Erdogan, Bayram and Deniz (2007), was employed to measure student attitudes toward web-based education in this research. The scale, which is 5-point Likert scale, consists of 26 items and 2 factors. These two factors explain 47.308% of total variance. According to factor analysis conducted by Erdogan, Bayram and Deniz (2007), while the first factor consisting of 17 items was denominated as "The Efficacy of Web-Based Instruction", the second factor comprising 9 factors was denominated as "Resistance Against Web-Based Education". The first factor comprises positive items and the second factor comprises negative items. Negative items were coded inversely. The internal consistency coefficient for the whole scale was calculated as 0.861.

d. Computer Attitude Scale: "Computer Attitude Scale", which was developed by Janes and Clarke (1994) and adapted into Turkish by Uzunboylu (1995), was used to measure student attitudes toward computer. The scale, which is 5-point Likert-type, consists of 40 items and it has one factor. The internal consistency coefficient of the scale was calculated as 0.97. Positive items in the scale were graded from 5 to 1 and negative items were inversely graded from 1 to 5 in options of "Strongly Agree – Strongly Disagree".

Web-Based Instruction Practice

To be able to mention online self-regulated learning skills of students and their attitudes towards web-based education, of course, they should experience web-based learning. In this context, 6-week portion of the course of Computer II was applied in the form of web-based instruction. The course content incorporates the subjects of basic concepts regarding internet-based education, internet-based education in Turkey and the world, content design in internet-based education and learning and motivation. 3-week part of web-supported instruction practices lasting 6 weeks was performed in the normal hour of the course in the program; in the rest 3-week part, students were provided flexibility to resume their practices in anywhere. Computer laboratories were kept open in hours with no course under the supervision of department assistants for students to be able to easily access computer and internet. Student-student, student-instructor and student-content interaction were provided for students as both synchronous and asynchronous. Student questions related to content were provided synchronous or asynchronous feedback and correction within the context of chat and forum. Face-to-face interaction with students was abstained in the part of practice within the course, it was elaborated that all interaction was realized in chat platform. Asynchronous feedback was provided by using an online discussion forum in the part of practice outside the course.

A web site was prepared incorporating the subject of the basic concepts regarding internet-based education, internet-based education in Turkey and the world, content design in internet-based education and learning and motivation in accordance with web-based learning approach within the scope of research. In this web site, explanations of topics were supported by various videos. Dreamweaver software was used for visual design of the site, Articulate software was used for content design and Ms-Sql and PHP softwares were employed for learning management system. A student management system, where informations such as study durations of students, what topics are studied, answers given to exercises etc. are kept, is situated on the designed web site. Students can access topics via their own passwords. Necessary interventions were carried out aimed at ensuring students to use the system in accordance with records in learning management system.

Analyzing Data

Each item on scales was scaled as never (1), rarely (2), sometimes (3), usually (4), and always (5). Converting the scores that students provided for answers they gave to 5-point Likert type scale into standard scores in a way that the lowest one will be 20 and the highest will be 100 is appropriate. The following formula is utilized for converting raw scores to standard score:

$$X_{\text{standard score}} = \frac{X_{\text{rawscore}}}{NumberofScaleItems} x20$$

When students are grouped with respect to online self-regulated learning skill levels, students with the average score being 66 and below were designated as sub-group and students with the average score being 67 and above were designated as upper-group. Frequency, percentage, arithmetic average, t and Pearson's r correlation statistics were used on the collected data. Significance level of 0.05 was predicated on for testing of difference and correlations.

RESULTS

1. Self-Regulated Learning Skill Levels in Online Environments:

Online self-regulated learning levels of students, who participated in web-based learning practices, are summarized in Table 2.

Table 2. Online Self-Regulated Learning Levels of Students

Variables	N	$\bar{X}$	Sd	Min	Max
Goal Setting	169	70,65	14,22	32,00	100,00
Structuring the Environment		77,57	17,21	20,00	100,00
Task Strategies		65,98	13,19	30,00	95,00
Time Management		65,16	13,12	20,00	100,00
Help Seeking		71,63	14,30	25,00	100,00
Self-Regulation		71,41	14,23	30,00	100,00
Total		**70,56**	**11,19**	**35,00**	**95,00**

As seen in Table 2, online self-regulated learning skill scores of students vary between 35.00 and 95.00; their average is $\bar{X}$=70.56. Accordingly, it can be argued that self-regulated learning skills of students in online environments are high. When looking at in terms of scores regarding factors one by one, it is seen that the factor with the highest average is "Organizing Environment" ($\bar{X}$=77.57) and the factor with the lowest average is "Time Management" ($\bar{X}$=65.16). So, it can be uttered that the highest level student skills in terms of their online self-regulated learning levels is "Organizing Environment" and the lowest level is "Time Management".

2. The Relationship between Their Online Self-Regulated Learning Skills and Attitudes towards Internet

Online self-regulated learning skills of students were allotted into two groups as sub-level and upper-level. Students with the total score of online self regulated learning skills being 66 and below comprised sub-group and students with the total score of online self regulated learning skills being 67 and above constituted upper-group. Findings related to the relationship between online self-regulated learning skills and attitudes towards internet are summarized in Table 3.

Table 3. The Relationship between Online Self-Regulated Learning Skills and Attitudes towards Internet

	Goal Setting	Structuring the Environment	Task Strategies	Time Management	Help Seeking	Self-Regulation	**Total**
Internet Denial	,240(**)	,237(**)	,071	,153(*)	,179(*)	,214(**)	,246(**)
Internet Trust	,079	,124	-,021	-,011	,017	,136	,081
Belief in Internet's	,100	,133	-,064	-,013	,050	,102	,080

Benefits							
Enjoying Internet	,117	,111	,004	,027	,112	,120	,113
Enjoying Internet's benefits	,095	,136	,002	,157(*)	,134	,271(**)	,173(*)
Total	,195(*)	,216(**)	,017	,097	,149	,226(**)	,207(**)

N:169; ** p< 0.01; * p<0.05.

It is observed in Table 3 that there is a positive and significant relationship (r=.207) between the total score of online self-regulated learning skill and the total score of attitude towards internet. Besides, there is a positive and significant relationship between the total score of attitude towards internet and "Goal Setting", "Organizing Environment" and "Self-Evaluation"; between the total score of online self-regulated learning and the factor of "Denying Internet". Accordingly, it can be said that as positive attitudes of students towards internet increase, their online self-regulated learning skill levels also increase. Besides, as their attitudes toward internet increase, their skill levels of "Goal Setting", "Organizing Environment" and "Self-Evaluation" accordingly increase; as "Denying Internet" increases, their total scores of online self-regulated learning accordingly increase.

Considering in terms of factors, there is a significant positive relationship between total scores for online self-regulated skills and "Enjoying Possibilities that Internet Offers" and "Time Management", "Self-Evaluation" among other skills except the factor of "Denying Internet" and "Duty Strategies" among self-regulated learning skills. Accordingly, it can be argued that as student levels for getting accustomed to internet go up, their skill levels of "Goal Setting", "Organizing Environment", "Time Management", "Seeking Help" and "Self-Evaluation" also increase. On the other hand, it can be said that as their attitudes of "Enjoying Possibilities that Internet Offers" increase, their "Time Management" and "Self-Evaluation" skill levels also go up. Findings related to differentiation in student attitudes towards internet with respect to their online self-regulated learning skills are summarized on Table 4.

Table 4. Differentiation among Student Attitudes towards Internet with respect to Their Online Self-Regulated Learning Skill Levels

Variables		N	$\bar{X}$	Sd	t	Df	P
Internet Denial (reverse coded)	Subgroup Topgroup	53 116	77,89 83,29	13,27 12,51	-2,557	167	,011
Internet Trust	Subgroup Topgroup	53 116	75,28 78,10	18,15 15,82	-1,026	167	,306
Belief in Internet's Benefits	Subgroup Topgroup	53 116	77,83 79,57	15,86 15,25	-,679	167	,498
Enjoying Internet	Subgroup Topgroup	53 116	78,49 83,49	14,79 23,71	-1,414	167	,159
Enjoying Internet's benefits	Subgroup Topgroup	53 116	73,36 78,26	16,74 15,60	-1,952	167	,046
Total	Subgroup Topgroup	53 116	76,96 81,28	11,57 11,73	-2,228	167	,027

As seen in Table 4, there is a significant differentiation among student total scores for attitude towards internet according to their online self-regulated learning skill levels ($t_{(2\text{-}167)}$ =-2,228; p<,05). When looking at attitude toward internet in terms of factors, it is seen that there is a significant differentiation between factors of "Denying Internet" ($t_{(2\text{-}167)}$=-2,557; p<,05) and "Enjoying Possibilities that Internet Offers" ($t_{(2\text{-}167)}$=-1,952; p<,05), as for other factors, there is not a significant differentiation with respect to online self-regulated learning skills. When averages examined, it is seen that differentiation is in favor of upper group. Accordingly, it can be asserted that the total score of online self-regulated learning skill levels differentiate student attitudes towards internet in terms of factors of "Denying Internet" and "Enjoying Possibilities that Internet Offers". In other words, online self-regulated skills affect student attitudes towards internet.

3. The Relationship between Online Self-Regulated Learning Skills and Attitudes towards Web-Based Education

Findings pertaining to the relationship between online self-regulated learning skills and attitudes toward web-based learning are summarized on Table 5.

Table 5. The Relationship between Online Self-Regulated Learning Skills and Attitudes towards Web-Based Education

	Goal Setting	Structuring the Environment	Task Strategies	Time Management	Help Seeking	Self-Regulation	**Total**
Effectivity of WEB Based Teaching	,082	,140	,064	,105	,229(**)	,148	,169(*)
Resistance against Web Based Teaching	,223(**)	,207(**)	,303(**)	,181(*)	,204(**)	,163(*)	,274(**)
Total	,046	,015	,098	,003	,092	,045	,005

N:169; ** p< 0.01; * p<0.05.

It is seen in Table 5 that there is no relationship between the total score for online self-regulated learning skill and total scores for attitude towards web-based learning. So, it can be argued that an increase or a decrease in total scores of student attitudes towards web-based learning do not affect total scores for online self-regulated learning skill. Considering in terms of factors, it is observed that there is a significant positive relationship between the factor of "The Efficacy of Web-Based Instruction" and "Seeking Help" and total scores for online self-regulated learning skill. Additionally, it is seen that there is a significant positive relationship between all factors and total scores concerning online self-regulation skills and the factor of "Resistance Against Web-Based Education". Accordingly, it can be uttered that as attitudes towards the factor of "The Efficacy of Web-Based Instruction" rise, all factors and total scores of students regarding "Seeking Help" and total scores of online self-regulated learning skills also go up accordingly. Besides, it can be said that as their attitudes for "Resistance Against Web-Based Education" rise, all factors and total scores of students regarding online self-regulation skills also increase accordingly. Findings related to differentiation in student attitudes towards web-based learning with respect to their online self-regulated learning skills are summarized in Table 6.

Table 6. Differentiation among Student Attitudes towards Web-Based Instruction with respect to Their Online Self-Regulated Learning Skill Levels

Variables		**N**	$\bar{X}$	**Sd**	**t**	**Df**	**P**
Effectivity of WEB Based Teaching	Subgroup	53	67,94	13,65	-2,762	167	,006
	Topgroup	116	74,04	13,17			
Resistance against Web Based Teaching	Subgroup	53	66,70	14,35	1,879	167	,062
	Topgroup	116	61,89	15,91			
Total	Subgroup	53	67,53	10,74	-1,378	167	,170
	Topgroup	116	69,84	9,86			

As seen in Table 6, there is a differentiation only in terms of the factor of "The Efficacy of Web-Based Instruction" in student attitudes towards web-based learning with regard to online self-regulated learning skill levels of students ($t_{(2-167)}$=-2,762; p<,05). When averages examined, it is seen that this differentiation is in favor of upper group. It is observed that there is no significant differentiation between groups in terms of total score and the factor of "Resistance Against Web-Based Education". Accordingly, online self-regulated learning skill levels can be said to differentiate student attitudes towards web-based education in terms of the factor of "The Efficacy of Web-Based Instruction".

4. The Relationship between Online Self-Regulated Learning Skills and Attitudes towards Computer

Findings pertinent to the relation between online self-regulated learning skills and attitudes towards computer are summarized in Table 7.

Table 7. The Relationship between Online Self-Regulated Learning Skills and Attitudes towards Computer

	Goal Setting	Structuring the Environment	Task Strategies	Time Management	Help Seeking	Self-Regulation	**Total**
Attitude toward computer	,213(**)	,270(**)	,070	,148	,237(**)	,178(*)	,254(**)

N:169; ** p< 0.01; * p<0.05.

It is seen in Table 7 that there exists a significant positive relationship between the total score of online self-regulated learning skill and the factors of "Goal Setting", "Organizing Environment", "Seeking Help" and "Self-Evaluation" and student attitudes towards computer. Accordingly, it can be said that as attitudes of students toward computer increase, correspondingly “Goal Setting”, “Organizing Environment”, “Seeking Help” and “Self-Evaluation” increase as well. Findings related to differentiation in student attitudes towards computer with respect to online self-regulated learning skills of students are summarized in Table 7.

Table 8. The Affect of Online Self-Regulated Learning Skill Levels on Student Attitudes towards Computer

Variables		N	$\bar{x}$	sd	t	df	P
Attitude toward computer	Subgroup	53	66,83	9,08	-	16	,000
	Topgroup	116	72,74	8,37	4,144	7	

As seen in Table8, there is a significant differentiation in student attitudes towards computer with respect to their online self-regulated learning skill levels ($t_{(2-167)}$=-4,144; p<,01). When averages examined, this differentiation is in favor of upper-group. So, online self-regulated learning skill levels differentiate attitudes of students towards computer.

5. The Relationship between Attitudes toward Web-Based Education, Computer and Internet
Findings pertaining to the relationship between attitudes of students towards web-based education, computer and internet are summarized on Table 9.

Table 9. The Relationship between Attitudes toward Web-Based Education, Computer and Internet

	Effectivity of WEB Based Teaching	Resistance against Web Based Teaching	Total	Attitude toward computer
Internet Denial	,395(**)	,034	,364(**)	,529(**)
Internet Trust	,366(**)	,084	,368(**)	,350(**)
Belief in Internet’s Benefits	,532(**)	,053	,496(**)	,402(**)
Enjoying Internet	,271(**)	,056	,271(**)	,234(**)
Enjoying Internet’s benefits	,503(**)	,042	,462(**)	,407(**)
Total	,528(**)	,068	,501(**)	,531(**)

N:169; ** p< 0.01; * p<0.05.

It is observed in Table 9 that there exists a significant and positive relationship between student attitudes towards computer and internet in terms of both total score and factors. On the other hand, it is seen that there exists a significant positive relation between attitudes of students towards computer and total scores of student attitudes towards web-based learning and factor scores for “the Efficacy of Web-Based Instruction”. Accordingly, as attitudes of students towards internet rise, it can be said that their attitudes toward computer also rise accordingly. Furthermore, it can be uttered that as student attitudes towards internet increase, total scores of attitudes towards web-based learning and factor scores of “the Efficacy of Web-Based Instruction” go up accordingly.

DISCUSSION AND CONCLUSION
1. Self-regulated learning skill levels of students in online learning environments are high. While the highest level skills of students are “Organizing Environment” in terms of their online self-regulated learning levels, their lowest skill is “Time Management”. Even though online learning environments are popular today, students receiving education in the college where this research was conducted generally have gotten to know online learning environments recently. High scores of students in the sub-factor of “organizing environment” should not be perceived as contradictory with this situation since students are unfamiliar with the online learning environment, not online environment. Put it differently, online experiences that students attained before assisted them while organizing online learning environment during the learning process realized throughout research. On the other hand, their low scores in the sub-factor of “time management” is a situation frequently emphasized in the literature. Howland and Moore (2002) stated the difficulty for students to follow a specific work schedule in a learning environment and organizing time is a critical requirement for student achievement.

2. Online self-regulated learning skill levels differentiate student attitudes towards internet in terms of the total score for attitude toward internet, the factors of “Denying Internet” and “Enjoying Possibilities that Internet Offers”. In other words, online self-regulation skill levels affect attitudes of students towards internet. Students with high level of self-regulation approach activities for learning more willingly, spend a great deal of effort in this respect and use more effective strategies by striving against adversities for a long time (Eggen and Kauchak, 1999). Today, if one of these strategies is considered to resort to internet directly for reaching information and solving any problem encountered, it can be asserted that students with high online self-regulation levels have high attitudes towards internet. In fact, by determining their academic goals, students with high self-regulation skill choose required learning strategies to reach these goals and constantly follow the goal period. Students, who exhibit their goals, make effective planning and constantly follow the goal period, display higher accomplishment academically than the other students, who do not perform these activities (Kovach, 2000). Looking at the literature, self-regulation strategies, when they are used effectively, affect academic accomplishment of students and it was put forward that there exists a positive correlation between the use of learning strategies by self-regulating and academic accomplishment scores (Volters, 1998; Cited by Ergul, 2006). As positive attitudes of students toward internet increase, their online self-regulated learning skill levels also increase. Besides, as their attitudes towards internet go up, their skill levels for “Goal Setting”, “Organizing Environment” and “Self-Evaluation” increase; as “Denying Internet” increases, total scores for online self-regulated learning soar accordingly. On the other hand, as student levels for getting accustomed to internet rise, their skill levels for “Goal Setting”, “Organizing Environment”, “Time Management”, “Seeking Help” and “Self-Evaluation” also go up; as their attitudes for “Enjoying Possibilities that Internet Offers” go up, their skill levels for “Time Management” and “Self-Evaluation” go up as well.

3. Online self-regulated learning skill levels differentiate student attitudes toward web-based education in terms of the factor of “the Efficacy of Web-Based Instruction”. An increase or a decrease in total scores of student attitudes towards web-based learning does not affect total scores of online self-regulated learning skills. Nevertheless, as their attitudes regarding the factor of “the Efficacy of Web-Based Instruction” rise, total scores of online self-regulated learning skills of students and “Seeking Help” rise accordingly. Furthermore, as their attitudes of “Resistance against Web-Based Education” go up, all factors and total scores concerning online self-regulation skills of students rise accordingly.

4. Online self-regulated learning skill levels differentiate student attitudes toward computer. As student attitudes towards computer increase, accordingly, “Goal Setting”, Organizing Environment”, “Seeking Help”, “Self-Evaluation” and total skill levels soar as well.

5. As student attitudes towards internet go up, their attitudes towards computer go up correspondingly. Besides, as attitudes of students directed to internet rise, total scores of attitudes directed to web-based learning and factor scores of “the Efficacy of Web-Based Instruction” go up correspondingly.

As a conclusion, further research is needed aimed at how their online self-regulated learning skills affect attitudes of students directed to computer, internet and web-based education and additionally, how these variables affect academic success. Educational institutions, instructors and instructional designers obtaining more pre-information about perception, motivation and attitudes of students before performing a course will serve them to increase interaction diversity in online environments, to better understand problems that students might face and as a result, to effectively fulfill educational goals of students.

REFERENCES

Aase, S. (2000). Online learning goes the distance. *International Data Corp*., [online]. Retrieved March, 2011, from http://www.itdl.org/journal/Jan_04/article02.htm.

Alkan, C. (1989). *Eğitim teknolojisi*. Ankara: Anı Yayıncılık.

Ally, M. (2004). Foundations of educational theory for online learning. In T. Anderson (Ed.), *The theory and practice of online learning* (pp. 15-44). Edmonton, CA: Athabasca University Press.

Barnard, L., Lan, W.Y., To, Y.M., Paton, V.O., & Lai, S.L. (2009) .Measuring self-regulation in online and blended learning environments. *The Internet and Higher Education,* 12, 1-6.

Boekaerts, M. (1999). Self–regulated learning: Where we are today. *International Journal of Educational Research*, 31(6), 445-457.

Butler, D. & Winne, P. (1995). Feedback and SRL: A theoretical synthesis. *Review of Educational Research*, 65, 245-281.

Chang, M.M. (2007). Enhancing web-based language learning through self-monitoring. *Journal of Computer-Assisted Learning*, 23, 187-196.

Chung, M. (2000). The development of self-regulated learning. *Asia Pacific Education Review*, 1(1), 55-66.

Cunningham, C.A. & Billingsley, M. (2003).*Curriculum Webs: A practical guide to weaving the Web into teaching and learning*. Boston: Allyn and Bacon.
Cüceloğlu, D. (1998). *İnsan ve davranışı*. İstanbul: Remzi Kitabevi.
Eggen, P. & Kauchak, D. (1999). *Educational psychology*. Fourth Ed. New Jersey: Printice-Hall, Inc.
Erdoğan, Y., Bayram, S. & Deniz, L. (2007). Web tabanlı öğretim tutum ölçeği: Açıklayıcı ve doğrulayıcı faktör analizi çalışması. *Uluslararası İnsan Bilimleri Dergisi,* 4(2), 1-14.
Ergül, H. (2006). Çevrimiçi eğitimde akademik başarıyı etkileyen güdülenme yapıları. *The Turkish Online Journal of Educational Technology – TOJET* January 2006 ISSN: 1303-6521 volume 5 Issue 1 Article 13.
Fisher, M. & Baird, D. E. (2005). Online learning design that fosters student support, self-regulation, and retention. *Campus-Wide Information Systems, 22*(5), 88-107.
Hodges, C. B. (2005). Self-regulation in web-based courses: A review and the need for research. *The Quarterly Review of Distance Education*, *6*(4), 375-383.
Howland, J. L. & Moore, J. L. (2002). Student perceptions as distance learners in internet-based courses. *Distance Education*, *23*(2), 183-195.
Imel, S. (1997). *Web-based training*. Columbus, OH: ERIC Clearinghouse on Adult, Career, and Vocational Education Center on Education and Training for Employment College of Education. (ERIC No. ED414446)
Jones, T., Clarke, V. A. (1994). A computer attitude scale for secondary student. *Computer Education. 22*(4).
Keser, H. (1988). *Bilgisayar destekli eğitim için bir model önerisi*. Yayınlanmamış Doktora Tezi, Ankara Üniversitesi, Sosyal Bil. Enstitüsü, Ankara.
Khine, M.S. (2001). Attitude toward computer among teacher education student in Brunei Darussalam. *International Journal of Instructional Media*, *28(2), 147-153*
Kitsantas, A. & Dabbagh, N. (2010). *Learning to Learn with Integrative Learning Technologies (ILT): A Practical Guide for Academic Success*. Information Age Publishing.
Korkmaz, Ö., Kaya, S. (in press). Adapting Online Self-Regulated Learning Scale into Turkish. TOJDE.
Kovach, J. C. (2000). Self-Regulatory Strategies in An Acoounting Principles Course:Effects on Student Achievement, Paper presented October28, 2000 at the Mid-Western Educational Research Assoc., Chicago, IL, Available at: http://www.cedu.niu.edu/pierce/SelfregulatoryStrategies.htm
Ley, K. & Young, D. B. (1998).Self-regulation behaviors in underprepared (developmental) and regular admission college students. *Contemporary Educational Psychology*, 23, 42-64.
Lynch, R. & Dembo, M. (2004). The relationship between self-regulation and online learning in a blended learning context. *International Review of Research in Open and Distance Learning*, *5*(2), 1-16.
McManus, T.F. (2000). Individualizing instruction in a Web-based hypermedia learning environment: Nonlinearity, advance organizers, and self-regulated learners. *Journal of Interactive Learning Research*, 11, 219-251.
Miltiadou, M. & Savenye, W.C. (2003).Applying social cognitive constructs of motivation to enhance student success in online distance education. *Educational Technology Review*, *11*(1), 78-95. Norfolk, VA: AACE.
Özgür, H. & Tosun, N. (2010). İnternet destekli eğitimin e-öğrenme tutumlarına etkisi. *XV. Türkiye'de İnternet Konferansı*, 2-4 Aralık . İstanbul: İstanbul teknik Üniversitesi
Perraton, H. (1988). A theory for distance education. In D. Sewart, D. Keegan, Holmberg (Ed.), *Distance education: International perspectives*, New York: Routledge.
Pintrich, P.R. & Groot, E.V.D. (1990).Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, *82*(1), 33-40.
Pintrich, P.R. (2000). The roal of goal orientation in self-regulated learning.In M. Boekaerts, P. R. Pintrichve M. Zeidner (Eds.), Handbook of self-regulation (pp. 451-502). San Diego, CA: Academic Press.
Reigeluth, C.M. (1999). What is instructional desing theory and How is it changing? . In C.M. Reigeluth (Ed.). *Instructional Design Theories and Models: A New Paradigm of Instructional Theory,* (Vol II) (s:5-29). Mahwah, NJ: Lawrence Erlbaum Associates.
Tavşancıl, E. ve Keser, H. (2001) İnternete yönelik likert tipi bir tutum ölçeğinin geliştirilmesi. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi,* 34(1-2), 45-60.
Uzunboylu, H. (1995).Bilgisayar öğrenme düzeyi ile bilgisayara yönelik tutumlar arasındaki ilişki (Yayınlanmamış Yüksek Lisans Tezi) Ankara Üniversitesi. Sosyal Bilimler Enstitüsü.
Wirth, J. & Leutner, D. (2008). Self-regulated learning as a competence. Implications of theoretical models for assessment methods. *Journal of Psychology*, 216(2), 102-110.
Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice*, 41(2), 64-70.
Zimmerman, B.J. & Martinez-Pons, M. (1990). Student differences in self-regulated learning: relating grade, sex and giftedness to self-efficacy and strategy-use. *Journal of Educational Psychology*, 82(1), 51-59.
Zimmerman, B.J. (1994). Dimensions of academic self-regulation. In D. H. Schunk & B. J. Zimmerman (Eds.), *Self-regulation of learning and performance: Issues and educational applications* (pp. 3-21). Hillsdale, NJ: Lawrence Erlbaum.

THE INFORMATION AGED: EXAMINATION OF UNIVERSITY STUDENTS' ATTITUDES TOWARDS PERSONAL DIGITAL ASSISTANTS (PDAS) USAGE IN TERMS OF GENDER, AGE AND SCHOOL VARIABLES

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ABSTRACT
Recently, there has been a rabid development of new technology devices that were proved to have significant effects on education, one of which is known as Personal Digital Assistant (PDA). PDAs offer new possibilities for providing better learning experiences and more learning opportunities in the sector of higher education. A quantitative design was utilised to examine university students' attitudes towards the use of PDAs. A cross-sectional survey was conducted to obtain data from participants. The sample was comprised of 250 participants. Gender, age and school major were selected as student's demographic variables for the study. The data were analysed by calculating frequencies, percentages and ~~by~~via conducting t-test and One-Way ANOVA. The results of this study revealed that firstly, the university students' attitudes towards PDA usage are positive, secondly, attitudes were significantly different in accordance with students' gender, it was found that males' attitude scores are significantly higher than that of the females, and thirdly, no significant differences were found in students' attitudes towards the PDA in terms of age and school-variables. Besides, the findings indicated that university students were overall satisfied with their earlier experience of using PDAs for learning purposes.
Keywords: Attitudes, Personal Digital Assistants, Gender, Age, Faculty

INTRODUCTION

Technologies help to run almost all aspects of life. In this era, there has been an extensive number of technologies come forward to enhance the quality of education. New technologies are mainly developed and being built up to improve the process of teaching and learning. One of these technologies is called Mobile-learning, which is considered as a new source of learning. Mobile-learning is a part of E-learning and refers to learning using a mobile device. Besides, it has been defined as a form of providing learning opportunities characterised by the separation of a teacher and learners in terms of time and a fixed location (Alexander, 2004). Some educators have suggested that the use of mobile devices is new in education and could have a particularly significant role to play in order to perform learning process accurately and effectively (Traxler, 2005). Nowadays, and with the development of modern mobile phones learners can "access to the web-based content, remix it, share it, collaborate with others, and create media-rich deliverables for the classroom teacher as well as a global audience" (Ferry, 2009, p.19). Moreover, mobile devices can offer different forms of information. However, the benefits of using mobile phones can highly affect learners' learning process (Switzer & Csapo, 2005). There are a number of factors that affect the successful usage of technology in the educational settings. Among these factors, attitude is a key factor to affect users' success in using and accepting technology. Previous researches suggest that individuals' attitudes should be assessed because attitudes can influence the acceptance of technology and future behaviour regarding the actual usage (Woodrow, 1991).

RELATED LITERATURE

The use of PDAs in education

In recent years, the internet and other technology devices have gained much popularity in the field of education. These technologies have been quickly adopted and are becoming mainstream methods. One of these technologies is Modern Mobile Phones with software. Recently, many Mobile Phones' companies have started selling a brand new generation of handheld mobile devices called a 'Personal Digital Assistance' (PDA). Kitchiner (2006, p.447) defines PDA as "a term for any small mobile hand-held device that provides computing and information storage and retrieval capabilities for personal or business use". The visual and communication technologies associated with text, sound, audio, picture, and internet access were integrated in these devices. The popularity of pdas is increasing and has received a rapid growth under the popularisation of internet. Guthery and Cronin (2002) reported that by 2003 more than a billion people will be using a PDA for voice and data communications. Educators and researchers have been keen to incorporate pdas in the educational activities.

They suggest that there are a number of distinctive characteristics of pdas compared to desktop and laptop computers. Pdas are more portable because of their small size keyboard with a wide range of available applications (Pattillo, Brewer, & Smith, 2007), their cost substantially less than a laptop or desktop computer, easier to transport than laptop computers, and they allow for greater flexibility in the testing venue compared with laptops (Trapl et al., 2005).

In the field of education a PDA becomes a powerful educational tool because it includes new features, which might be used for several purposes in the context of education (Boticki, Mornar & Andric, 2006; Pattillo, Brewer, & Smith, 2007). There are various advantages for using the PDAs to support students' learning, including (1) PDA enables learning to occur virtually anywhereand anytime, (2) it can be used to collect data about various subjects (Belanger, 2005), (3) it is auseful tool for sharing information among students via a wireless network (Sheehy et al., 2005), (4) it can serve as a channel of communication, (5) it is a great tool to improve students' learning vocabulary (Song & Fox, 2008), and (6) it has a positive role on improving students' collaboration (Finn &Vandenham, 2004). Although, PDAs help students to view articles transferred from computers or any other sources (Bodomo, 2009). According to Dale and LeFlore (2007), the most common use of PDAs as a tool includes'accessing the Internet, sending and receiving e-mail messages, video recording, word processing, developing spread sheets, accessing the radio or stereo, and accessing a global positioning system'. With PDA new possibilities of learning are offered. Song and Fox (2008) conducted a multiple case-study approach to investigate undergraduate students' PDAs dictionary use to enhance their incidental vocabulary learning and found that students made a variety of uses of PDAs to improve their vocabulary learning. Kim, Mims, and Holmes (2006) reviewed the ways using personal digital assistants (PDAs) in some universities. They found that the most general use of using PDSs at these universities is to retrieve information such as e-books, courseware, and timetables. Thus, with the PDAs students can read their e-mails, search the Web, write letters, send SMS, make voice recordings, read books, take photos, write notes, play games and listen to music. In the case of the PDAs, all these things are possible.

The importance of attitudes

Attitude is an important key in the field of technology integration. There is an extensive body of literature demonstrates the importance of attitudes on technology acceptance. Moreover, in the technology acceptance, users' attitudes towards innovations have been recognised as powerful predictors to adopt a wide variety of technological innovations among users (Rogerss, 2003). Vishwanath et al. (2009) described attitudes as the main factor drive the choice to adopt innovative technologies. Attitudes towards technology influence users' acceptance of the usefulness of technology (Clark, 2001). Agarwal and Prasad, 2000) posits that attitudes towards technology utilisation represents the degree to which an individual likes various attributes of a given technology. According to Watson (1998), developing positive attitudes towards technology is a key element not only for enhancing technology integration but also for avoiding users' resistance to technology use. Thus, negative attitudes towards technology among users represent a serious problem and it may drive the choice of users not to adopt innovative technologies

The purpose and questions of the study

A number of studies investigated people's attitudes towards technology. Yet, studies on the attitudes of students towards the use of PDA are limited. PDAs become an important tool in students' education. According to Caruso (2004), there is a strong adoption of the PDAs among professionals in some areas. In the same time, there is a slower rate of PDAs' adoption among students. The reason for measuring students' attitudes towards the use of PDAs is related to the fact that students' attitudes may affect their success in actual use of PDAs for their academic lives. The research concentrated on answering the following questions:

1) What are the attitudes towards using PDAs for learning purposes among university students?
2) Are there any differences between the attitudes of university students according to their gender?
3) Are there any differences between the attitudes of university students according to their age?
4) Are there any differences between the attitudes of university students according to their school?

METHOD

This study was carried out by using a survey method. In this study, the data is presented to examine the attitudes of university students' towards the use of PDAs for learning purposes.

Population and sample

An opportunity sample of under and post graduate students enrolled in School of Educational Studies, Computer Science, Pharmacy, Social Science, Humanities, Management and Housing Building and Planning courses at Universiti Sains Malaysia served as subjects in this study. In total, 250 university students answered the questionnaire. All the participants own a PDA or a touch screen mobile phone.

Instrument

This is a quantitative study aims to examine the university students' attitudes towards the use of PDAs. The dependent variable has been identified as attitudes towards PDA. Independent variables are determined as gender, age, level of education and school's major. A pool of statements about attitudes towards PDAs was developed using existing well documented instruments adopted from some previous studies done by Loyd and Gressard (1984b), Smith, Caputi, and Rawstorne (2000), Popovich, Hyde, Zakrajsek, and Blumer (1987) and Albirini (2006) in the context of attitudes towards technology. Respondents were required to complete two parts of the survey. The first section of the survey required respondents to provide basic demographic information such as gender, age and school. The second part of the instrument is composed of 26 items divided into 4 categories (Perceived Usefulness 9 items, Perceived Ease of Use 7 items, Enjoyment 5 items and Perceived Satisfaction 5 items). Each item is to be responded on a five-point Likert-scale. This measurement tool which was of the Likert type was made up of the following options; 'Strongly Disagree', 'Disagree', 'Undecided', 'Agree', and 'Strongly Agree'.

Data analysis

Data was collected using a questionnaire. Statistical Package for Social Science (SPSS) 16.0 was used to analyse the collected data. Descriptive statistics such as means, standard deviations, and percentages were used to depict the demographic information of the participants and their responses to the items to determine their attitudes towards the use of PDAs. To further analyse the data, an independent sample *t*-test and ANOVA were used to determine if there were any significant differences in students' attitudes towards the use of PDAs based on their gender, age, and school's major.

RESULTS

Validity and reliability of scales

The face validity and content validity of the questionnaire were assessed individually by four experts in the field of educational technology. Cronbach's reliability analysis was performed to test internal consistency of the variables.

Table 1: Reliability Assessment

Variables	Cronbach alpha (α)	Mean	SD
Usefulness (PU)	.96	3.91	.90
Ease of Use (PEOU)	.89	3.35	1.13
Enjoyment (PE)	.85	3.75	.72
Satisfaction (PS)	.90	3.00	1.01

Table 1 displays the means and standard deviations and the Cronbach's Alpha reliabilities value of all the research variables. The Cronbach's alpha values were 0.85 for the Perceived Enjoyment (PE), 0.90 for the Perceived Satisfaction (PS), 0.89 for the Perceived Ease of Use (PEU), and 0.96 for the Perceived Usefulness (PU). The results of the Cronbach's Alpha for the scale reliabilities were extraordinarily high and indicated that the items for each scale were internally consistent and reliable.

Questionnaire Construct validity: Factor Analysis

The principal component analysis (PCA) was conducted to determine the underlying factors of attitudes' questionnaire. The assumptions of inter-correlation of variables suggested that the data was appropriate for the usage of PCA. Bartlett's Test of Sphericity was found to be statistically significant [(325) = 3614.56, p = 0.001)]. The measure of Kaiser-Meyer-Olkin (KMO) was 0.790 indicating adequate information about the measure of each construct. The overall measurement of sampling adequacy (MSA) fulfilled the requirement ($>$ 0.50). The factor loadings at > 0.30 were accepted, while the loadings of < 0.30 were suppressed. The attitudes (29) items were subjected to Varimax rotation method using PCA as a test of construct validity. After conducting the analysis the items with weak loadings < 0.30 or with negative values were deleted. The results revealed four factors measured by the data with only 39 items retained for further analysis as shown in Table 2. Three items were dropped from the analysis as they displayed a cross loading values exceeding 0.50.

Table 2: Confirmatory Factor Analysis of the Measurement Scales, PE, PS, PU, PEU

	Items	Factor 1	Factor 2	Factor 3	Factor 4
1	Many learning tasks can be done easier and faster using a PDA.	0.58			
2	PDA can be very useful in the teaching delivery of some subjects.	0.77			
3	I like to do assignments that allow me to use the PDA	0.77			
4	In many cases, PDA is superior to traditional instruction because it provides teaching suited to the individual student's needs.	0.74			
5	PDA makes it possible to work more productively	0.79			
6	PDA can allow me to do more interesting and imaginative work	0.63			
7	I find it useful to have a PDA when I am working or studying.	0,77			
8	It saves time when I use it	0.82			
9	PDA helps me to organize my work better	0.68			
1	I am satisfied with my PDA		0.75		
2	I would recommend my friends to use the PDA		0.79		
3	I feel I always need to use the PDA		0.70		
4	Using PDA is a pleasant experience.		0.69		
5	I welcome PDA because it permits smooth, quick information exchanges.		0.56		
1	I enjoy using the PDA			0.58	
2	It is fun to use the PDA			0.70	
3	The PDA enriches my leisure time.			0.66	
4	I spend a lot of time playing games using my PDA			0.77	
5	I used my PDA for chatting with friends			0.78	
1	It is easy for me to learn how to use the PDA				0.59
2	The PDA is easy to use				0.77
3	Using PDA does not scare me at all				0.63
4	The PDA is fixable				0.59
5	Using the PDA is effortless				0.68
6	I can use the PDA successfully every time				0.51
7	I feel that I am in control when I use a PDA				0.68
	Eigen Values	5.14	3.53	3.18	3.13
	% of Variance	19.78	13.6	12.25	12.05
	KMO	0.79			
	Sphericity Bartlett Test	3614.56*			
	Cumullative Variance	57.68			

Factors with Eigen values greater or equal to one accounted for about 57.68% of the total variance. The first rotated factor comprised 9 items. The factor loadings were from 0.58 to 0.82 which accounted for 19.78 % of variance. These items addressed ‘Perceived Enjoyment’. The second rotated factor comprised 5 items. The factor loadings were from 0.56 to 0.79 which accounted for 13.60% of variance. These items addressed ‘Perceived

Satisfaction'. The third rotated factor comprised 5 items. The factor loadings were from 0.58 to 0.78 which accounted for 12.25 % of variance. These items addressed 'Perceived Ease of Use'. The fourth rotated factor comprised 7 items. The factor loadings were from 0.51 to 0.77 which accounted for 12.05 % of variance. These items addressed 'Perceived Usefulness'.

Demographics of participants

The results are based on the questionnaire responses of 250 study participants. Table 3 depicts the distribution of the characteristics of the population surveyed. Of the students included in the study, 114 (45.6%) were males and 136 (54.4%) were females. The mean age of the respondents was 33.75 (S.D. = 6.43). Those aged between 30–39 years old form the largest group of all, (41.2%), followed by those between 20–29 years old (36.0%), those aged between 40-49 years old (12.8%) and those above 50 years old (10.0%). According to analysis; 41 students were enrolled in School of Educational Studies (16.4%), 41 students enrolled in Schoolof Computer Science (16.4%), 23 students enrolled in School of Pharmacy (9.2%), 44 students enrolled in School of Social Science (17.6%), 26 students enrolled in School of Humanities (10.4%), 50 students enrolled in School of Management (20.0%), and 25 students enrolled in School of Housing Building and Planning (10.0%).

Table 3: Demographics of the Study Sample

Characteristics		Frequency	Percent %
Gender	male	114	45.6
	female	136	54.4
Age	20-29	90	36
	30-39	103	41.2
	40-49	32	12.8
	More than 50	25	10
Faculty	Education	41	16.4
	Management	50	20
	Housing	25	10
	Social	44	17.6
	Pharmacy	23	9.2
	Humanities	26	10.4
	Computer	41	16.4

Attitudes towards PDAs by gender

An independent samples *t*-test was conducted to determine differences among the university students' attitudes towards the use of PDAs according to their gender. The results from Levene's Test for homogeneity of variance across the males and females groups for each variable indicated that homogeneity of variance was met for all the five variables. As $p > 0.05$ for all variables, Levene's Test shows that the groups were homogenous as shown in Table 4.

Table 4:*T*-test scores for students attitudes towards PDAs'usage according to gender

Variables	Gender	N	Mean	SD	Levene's Test for Equality of Variances		t-value	df	Sig. (2-tailed)
Usefulness	Male	114	4.20	0.75	**F**	**Sig.**	9.498	248, 1	0.000**
	Female	136	3.36	0.64	0.814	0.431			
Ease of use	Male	114	3.68	0.67			4.104	248, 1	0.000**
	Female	136	3.37	0.51	0.585	0.557			
Enjoyment	Male	114	3.36	0.82			2.775	248, 1	0.000**
	Female	136	3.11	0.65	0.943	0.147			
Satisfaction	Male	114	3.45	0.67			3.512	248, 1	0.013*
	Female	136	3.04	0.59	1.481	0.116			
Overall	Male	114	3.69	0.58			5.969	248, 1	0.000**
	Female	136	3.29	0.47	1.241	0.179			

As shown in Table 4, for the usefulness, the males' group reported a Mean (M= 4.20) with Standard Deviation (SD= 0.75) while females' group reported a Mean (M= 3.36) with Standard Deviation (SD= 0.64). A *T*-test between the Means gave (t (1, 248) = 9.498, p= 0.000 at p <0.05). The results indicated that there was a statistically significant difference in the usefulness Means among the gender groups favouring males. In other words, males exhibited higher attitudes towards PDAs' usefulness than females. Regarding the ease of use variable, the males' group reported a Mean (M= 3.68) with Standard Deviation (SD= 0.67) while females' group reported a Mean (M= 3.37) with Standard Deviation (SD= 0.51). A *T*-test between the Means gave (t (1, 248) = 4.104, p= 0.000 at p <0.05). The results indicated that there was a statistically significant difference in the ease of use Means among the gender groups favouring males. In other words, males showed higher attitudes towards PDAs' ease of use than females.

For the enjoyment variable, the males' group reported a Mean (M= 3.36) with Standard Deviation (SD= 0.82) while females' group reported a Mean (M= 3.11) with Standard Deviation (SD= 0.65). A T-test between the Means gave (t (1, 248) = 2.775, p= 0.000 at p <0.05). The results revealed that there was a statistically significant difference in the ease of use Means among the gender groups favouring males. In other words, males showed higher attitudes towards PDAs enjoyment than females. Regarding the satisfaction variable, the males' group reported a Mean (M= 3.45) with Standard Deviation (SD= 0.67) while females' group reported a Mean (M= 3.04) with Standard Deviation (SD= 0.59). A *T*-test between the Means gave (t (1, 248) = 3.512, p= 0.013 at p <0.05). The results revealed that there was a statistically significant difference in the satisfaction Means among the gender groups favouring males. In other words, males showed higher attitudes towards PDAs' satisfaction than females. The examination of the overall attitudes showed that the males' group reported a Mean (M= 3.69) with Standard Deviation (SD= 0.58) while females' group reported a Mean (M= 3.29) with Standard Deviation (SD= 0.47). A *T*-test between the Means gave (t (1, 248) = 5.969, p= 0.000 at p <0.05). The results revealed that there was a statistically significant difference in the satisfaction's Means among the gender groups favouring males. According to Table 4, the degree of perceived usefulness, ease of use, enjoyment and satisfaction of PDAs' use did differ depending on students' gender. The findings indicated that the male students reported higher values of perceived usefulness, ease of use, enjoyment and satisfaction more than the female students.

Attitudes towards PDAs in terms of age variable

This section details with the findings regarding the attitudes of the university students towards the PDAs according to students' ages. The results from Levene's Test for homogeneity of variance of comparing the dependent variable across the age groups indicated that homogeneity of variance was met for the dependent variable. As *p*> 0.05 for all variables, the results showed that the groups were homogenous as shown in Table 5.

Table 5: Test of Homogeneity of Variances for the Variables by Age Groups

Variables	F	df1	df2	Sig.
Overall Attitudes	0.672	3	246	0.246

To examine the differences in university students' attitudes towards the PDAs according to their ages; the One-Way ANOVA test was conducted.

Table 6: Means, standard deviations, and results of analysis of variance (ANOVA) on the overall attitudes by age groups

Overall Attitudes	**N**	**Mean**	**SD**	**ANOVA**	**Tukey Summary**
20-29	90	3.47	0.61	F(3, 246)= 2.725 p= 0.065	—
30-39	103	3.45	0.54		
40-49	32	3.46	0.58		
more than 50	25	3.44	0.49		

For the group of 20-29 years old reported a mean (M = 3.47) with a standard deviation (SD = 0.61) while the group of 30-39 years old reported a mean (M = 3.45) with a standard deviation (SD = 0.54), the group of 40-49 years old reported a mean (M= 3.46) with a standard deviation (SD = 0.58), and the group of over 50 years old reported a mean (M= 3.44) with a standard deviation (SD = 0.49). An ANOVA test between the means gave F (3, 246) = 2.725 at *p* = 0.065. As *p*> 0.05, the results indicated that there were no statistical significant differences in the overall mean groups. As seen in Table 6, no statistically significant differences were found (*p* = 0.212) in university students' attitudes towards the use of PDAs based on their age. According to the findings, age did not appear to make a significant difference in university students' attitudes towards PDAs' use.

Attitudes towards PDAs in terms of school

The results from Levene's Test for homogeneity of variance of comparing the dependent variable across the age groups indicated that homogeneity of variance was met for the dependent variable. As *p*> 0.05 for all variables, the results showed that the groups were homogenous as shown in Table 7.

Table 7: Test of Homogeneity of Variances for the Variables by Age Groups

Variables	F	df1	df2	Sig.
Overall Attitudes	1.582	6	246	0.153

One-Way ANOVA was used to test whether there was a significant difference in university students' attitudes towards the PDAs according to their schools.

Table 8: Means, standard deviations, and results of analysis of variance (ANOVA) on the overall attitudes by schools' groups

Overall Attitudes	N	Mean	SD	ANOVA	Tukey Summary
Education	41	3.38	0.53	F(6, 243) = 0.901 p= 0.494	—
Management	50	3.57	0.63		
Housing	25	3.56	0.59		
Social	44	3.45	0.56		
Pharmacy	23	3.36	0.29		
Humanities	26	3.40	0.56		
Computer	41	3.56	0.61		

Regarding the group of students from School of educational Studies, they scored a mean (M = 3.38) with a standard deviation (SD= 0.53), while the group of Management students scored a mean (M= 3.57) with a standard deviation (SD= 0.63), the group of Housing students scored a mean (M= 3.56) with a standard deviation (SD= 0.59), the group of Social Studies' students scored a mean (M= 3.45) with a standard deviation (SD= 0.56), the group of Pharmacy students scored a mean (M= 3.36) with a standard deviation (SD= 0.29), the group of Humanities students scored a mean (M= 3.40) with a standard deviation (SD= 0.56), and the group of Computer Sciences' students scored a mean (M= 3.56) with a standard deviation (SD= 0.61). An ANOVA test between the means gave F (6, 243) = 0.901 at p = 0.494. As p > 0.05, the results indicated that there were no statistical significant differences in the overall mean groups as shown in Table 8. The findings showed that the school did not significantly favour respondents on the overall attitudes towards PDAs among the seven school groups.

CONCLUSIONS AND SUGGESTIONS

The success of technology implementation within organisations depends on users' attitudes. The aim of the present study was to examine the attitudes of university students towards the use of PDAs for learning purposes. A second goal was to find out if there are there any differences between the attitudes of university students according to their gender, age and school. As a result; it is found that university students' attitudes towards PDAs are positive indicating that the majority of the students accepted the use of PDAs for learning purposes. This may be due to the fact that the new mobile phones especially the PDAs have become widespread enabling an entirely new way of learning. With regard to differences in mean levels of attitude towards PDAs, it was found that students' attitudes were significantly different in accordance with their gender, in other words, male students were found to have a higher level of attitude towards the PDAs' usage than the female students. Also, the results revealed that the attitudes of students towards PDAs did not differ according to age and school.

This study offered an important implication for the future professional development programs to prepare university students to use PDAs for educational purposes. The fact is for teachers to effectively use technology for educational purposes, they need to be familiar and comfortable with ICT use first. As a result of this study, the following recommendations are made:

1. Students should be motivated about developing their PDAs' skills.
2. Female students should be motivated about PDAs' usage for learning purposes.

3. Lectures must encourage their students to make use of the PDAs as a learning tool.
4. Future researchers need to consider the in-depth qualitative studies.
5. It is recommended that further researches can be done in various institutions and at various education levels to confirm the results of this study.
6. More research is needed to corroborate these findings.

REFERENCES

Agarwal, R., & Prasad, J. (2000). A field study of the adoption of software process innovations by information systems professionals. *IEEE Transactions on Engineering Management, 47*(3), 295−308.

Albirini, A. (2006). Teachers' attitudes toward information and communication technologies: the case of Syrian EFL teachers. *Journal of Computers & Education, 47*(4), 373-398.

Alexander, B. (2004). Going nomadic: Mobile learning in higher education.*EDUCAUSE Review, 39*(5), 28-35.

Belanger, Y. (2005). *Duke University iPod first year experience final evaluation report*.Available Online at http://cit.duke.edu/pdf/ipod_initiative_04_05.pdf.

Bodomo, A. B. (2009*). Computer-Mediated Communication for Linguistics and Literacy: Technology and Natural Language Education*. Information Science Reference. Hershey. New York.

Boticki, I., Mornar, V., & Andric, K. (2006).*Supporting and enhancing teaching and learning with mobile devices*. CD-ROM edition. ISBN: 3-89958-195-4.

Caruso, J. B. (2004). *ECAR study of students and information technology, 2004: Convenience, connection, and control, EDUCAUSE*. Available Online at http://www.educause.edu/KeyFindings/1165.

Clark, K. D. (2001). Urban middle school teachers' use of instructional technology.*Journal of Research on Computing in Education, 33*(2), 178–195.

Dale, J.C., &LeFlore, J. (2007). Personal Digital Assistants: Making the Most Use of Them in Clinical Practice. *Journal of Pediatr Health Care, 21*, 339-342.

Ferry, B. (2009).*Using mobile phones to enhance teacher learning in environmental education.University of Wollongong Research Online*.Available online at http://ro.uow.edu.au/cgi/viewcontent.cgi?article=1081&context.

Finn, M. &Vandenham, N. (2004).The handheld classroom: educational implications of mobile computing', *Australian Journal of Emerging Technologies and Society, 2*(1)21–35.

Guthery, S. B., & Cronin, M.J (2002).*Mobile Application Development with SMS and the SIM Toolkit*. McGraw-Hill Companies, Inc.

Kim, S.H., Mims, C., & Holmes, K.P. (2006).An introduction to current trends and benefits of mobile wireless technology use in higher education.*AACE Journal, 14*(1), 77-100.

Kitchiner, R. (2006). *The role of the personal digital assistant (PDA) in chiropractic practice*. Clinical Chiropractic, 9, 119-128.

Loyd, B. H., &Gressard, C. P. (1984b). Reliability and factorial validity of computer attitude scales. *Educational and Psychological Measurement, 44*, 501-505.

Pattillo, R. E., Brewer, M. & Smith, C. M. (2007) Tracking clinical use of personal digital assistant reference resources.*Nurse Educator, 32*, 39-42.

Popovich, P. M., Hyde, K. R., Zakrajsek, T., &Blumer, C. (1987).The development of the attitudes toward computer usage scale.*Educational and Psychological Measurement, 47*, 261–269.

Rogers, E.M. (2003). *Diffusion of Innovations*, 5th ed., Free Press, New York.

Sheehy, K., Kukulska-Hulme, A., Twining, P., Evans, D., Cook, D. and Jelfs, A. (2005).*Tablet PCs in Schools: A Review of Literature and Selected Projects, Coventry: Becta*. Available Online.at http://publications.becta.org.uk.

Smith, B., Caputi, P., &Rawstorne, P. (2000).Differentiating computer experience and attitudes toward computers: an empirical investigation.*Computers in Human Behavior, 16*, 59–81.

Song, Y., & Fox, R. (2008).Integrating Incidental Vocabulary Learning Using PDAs into Academic Studies: Undergraduate Student Experiences.*Hybrid Learning and Education: First International Conference, ICHL 2008 Hong Kong, China*. Available online at http://portal.acm.org/citation.cfm.

Switzer, S., &Csapo, N. (2005). Survey of student usage of digital technology: Teaching implications', Central Michigan University. *Issues in Information Systems, 6*(1).

Trapl, E., Borawski, E., Stork, P., Lovegreen, L., Colabianchi, N., Cole, M., &Charvat, J.(2005). Use of audio-enhanced personal digital assistants for school-based data collection.*Journal of Adolescent Health, 37*, 296–305.

Traxler, J. (2005). Defining Mobile Learning.*Paper presented in IADIS International Conference Mobile Learning.*Available online at http://www.iadis.net/dl/final_uploads/200506C018.pdf.

Vishwanath, A., Brodskyb, A., Shaha, S., Leonard, M., &Cimino, M. (2009).Patterns and changes in prescriber attitudes toward PDA prescription-assistive technology.*International journal of medical informatics, 78*, 330–339.

Watson, D. M. (1998). Blame the technocentricartifact! What research tells us about problems inhibiting teacher use of IT.In G. Marshall, & M. Ruohonen (Eds.), *Capacity building for IT in education in developing countries (pp. 185–192).*London: Chapman & Hall.
Woodrow, J. E. (1991). A comparison of four computer attitude scales.*Journal of Educational Computing Research, 7*(2), 165–187.

THE MANAGEMENT ASPECT OF THE E-PORTFOLIO AS AN ASSESSMENT TOOL: SAMPLE OF ANADOLU UNIVERSITY

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ABSTRACT
This article intends to introduce an e-portfolio system to help mentors assess the teacher candidates' performances and products in a large scale open and distance learning teacher training program. The Pre-School Teacher Training Program (PSTTP) of Anadolu University is a completely distance program that helps around 12.000 students get the required pre-service training to be able to apply for working at schools as teachers. This article focuses on design, implementation, management and evaluation of the e-portfolio system for PSTTP. In e-portfolio system, it is expected that the managerial decisions (i.e. program/course design and selection, technology selection, teaching method selection, so on.) are effective and efficient in many stages. Change in managerial understanding and structuring is required to improve the e-counseling system, one of the corner stones of e-portfolio implementation. In parallel with all these expectations and goals, developing and spreading the e-portfolio implementations which require constant evaluation and analysis of drawbacks and advantages will contribute to the structuring of the assessment process in distance education providing a more functional, active and faster participation.

ASSESSMENT VIA E-PORTFOLIOS IN DISTANCE EDUCATION

Assessment is a very important activity in determining the success and learning levels, behavioral changes and competencies of students in all on-campus, open and distance education systems because it increases the quality of the services offered to students, improves the education system and promotes its quality. The reason is that assessment allows determining whether the education is successful, the objectives have been achieved and changes in behaviors have occurred or not. Since assessment in the education field is based on changes in human behavior, direct observation is not possible; therefore, various techniques such as written examinations, short-answer questions, multiple choice questions, oral exams, assignments and projects are used for assessment purposes (Karaca, 2003). Tools that are used differs based on the content and method of the education activities. Particularly, there are differences between on-campus education and open and distance education in terms of assessment. The large number of students in open and distance education institutions, which offer services for mass education, causes limitations on the use of certain assessment tools. For example, oral evaluations are considered difficult to be used effectively in distance education; however, interaction opportunities and technological equipments offered by the information and communication technologies (ICT) make oral evaluation possible.

In recent years, parallel to the rapid developments in ICT, radical changes and developments have occurred in the education field including assessment. Changes in the educational technologies also affect assessment tools. Particularly, distance education institutions who take advantage of the global changes in ICT, develop various media and tools to meet their own needs. E-portfolio applications is one of those applications and they are used as an effective media and tool for the assessment of the education and teaching process, student success, and students competence for a specific course or subject.

Both in on-campus and distance education, evaluation of student success should not only involve grading, but it should also involve monitoring learning, identifying the student success, program efficiency and learning difficulties, creating students' interest, identifying and overcoming learning deficiencies, and improving knowledge for offering guidance services (Selvi, 1998). Considering the outcomes of the learning processes, waiting for the end of the education process for evaluation is not as valid as it was in the past. In addition to this type of assessment, formative assessment is getting more important in order to correct errors throughout the education process. E-portfolio applications, which allow the follow up of the components mentioned above and which are getting more important in the evaluation of the education process, allow students to gather their activities and assignments as a meaningful whole. These activities and assignments can be related to one or more than one field. E-portfolio supports other educational processes thanks to its large storage capacity of audio-visual content and allows the use of multi-purpose, systematic and efficient evaluation tools. Presenting various information sources in a meaningful whole using e-portfolio is crucial in the evaluation of distance education applications, particularly in the evaluation of Internet-based applications.

E-portfolio, which is defined as a digital storage area where audio-visual content such as text, picture, video and voice is stored (Abrami & Barrett, 2005), is a method that also includes software tools that support educational process and evaluation activities in addition to organizing the content (Ahn, 2004; Galloway, 2001; Reinhartz & Beach, 1999; Rogers & Chow, 2000). E-portfolio, which must be seen as a process, is important because it allows the construction of knowledge and offers different opportunities and multimedia options to evaluate prior knowledge (Tuttle, 2007). Otherwise, providing and proving documents related to student achievement are some other important characteristics and opportunities of e-portfolios.

E-PORTFOLIO AS AN ASSESSMENT TOOL AT ANADOLU UNIVERSITY

Anadolu University Open and Distance Education System, which closely follows the developments in ICT, have been using the e-portfolio applications effectively since 2008 as an assessment system. Anadolu University Distance Education System has continuously increased the number of Bachelor's degree, associate degree programs, and Bachelor's degree completion programs, and adjusted them in the past 28 years in accordance with the developments in the Turkish Higher Education system. (Çekerol & Şenel, 2008). The number of students in the 2009-2010 academic year is 1,124,768. This number equals to 48% of the students in Turkish higher education. Anadolu University Distance Education System does not only meet the higher education demand in our country, but it also offers training to national education, health, theology, agriculture, police, gendarmerie, land, air and naval forces staff through distance education (AOF, 2009a).

Open Education Faculty (OEF) Distance Education System, which takes advantage of the developments in ICT, is the pioneer of various applications in Turkey such as mobile applications, e-learning, synchronous facilitation service, and e-support. Also OEF increases the variety of the education media that it offers to its students. Each new application and technology causes innovations in assessment tools. E-portfolio, which is among the Internet-based evaluation methods, is seen as a new application at Anadolu University Open Education System. Since it is a first in Turkish higher education and in distance education, it reinforces the pioneer role of Anadolu University in educational applications.

Taking advantage of e-portfolio in the evaluation of the education process is important when the number of students and the geographical distance between the institution and the students are considered. Those students can offer evidence of the activities they are involved in and reflect their experiences as the advantages of e-portfolio. In addition, e-portfolio is seen as a solution to overcome problems such as the large number of distance education students and the limitations of time and human resources for evaluation.

At Anadolu University Open and Distance Education System, e-portfolio applications have been used effectively in Pre-school teaching B.A program (PSTTP) since the 2008-2009 academic year. Pre-school teaching B.A program is a 4 year Bachelor's degree program and is seen equal to the on-campus pre-school teaching Bachelor's degree programs in Turkey. E-portfolio is used for the evaluation of the 'School Experience' course in the 3rd year, and 'Teaching Implementation' and 'Community Service' courses in the 4th year in Pre-school teaching B.A program. School Experience and Teaching Experience courses, which aim the teacher candidates to learn about the preschools, preschool education programs, daily educational activities, and preschool teaching profession, are based on observation, planning, implementation and evaluation. Another implementation course, "Community Service" course, has been developed so that teacher candidates can learn and gain basic skills about works that aim to serve the society. This course covers activities such as identifying the current problems of the society, preparing projects to solve them, joining academic activities such as panels, conferences, congress, symposiums, etc. as audience, speaker or organizer, and voluntary involvement in various social projects. This course aims to enable the preschool teacher candidates to serve the society by preparing and doing activities related to the problems (such as environment, education, health, woman health, child care, etc.) of the society in which they live. The expectation from this course is that teacher candidates will become more active and democratic individuals and more active in issues such as solidarity and cooperation, undertaking responsibilities, and creating projects and putting them into implementation. Briefly, they are expected to gain experience in becoming modern individuals. E-portfolio system, which is used for evaluating these courses, is considered to be used for training qualified teachers who know and use the most updated ICT through distance education programs. Training of teachers, who are the corner stones of the creation of an educated, modern and innovative society, is one of the most important fields on which universities should focus.

"School Experience", "Teaching Implementation" and "Community Service" courses are taught and evaluated through e-portfolio. Teacher candidates login the e-portfolio system using the user name and passwords given to them and load their activity reports to the portal every week regularly. Mentors and academic facilitators evaluate those activity reports and give feedback to the teacher candidates. Teacher candidates can revise their reports based on the mentors' and academic facilitators' feedbacks and reload them to the portal in one week. The last loaded report is taken into consideration while grading the reports. In this way, to what extend the students take into account the suggestions and warnings of their mentors and academic facilitators and their efforts for the course is evaluated objectively. If the teacher candidate does not load an activity report till the end of the second week, she or he is considered absent for that week. Mentors and academic facilitators attach great importance to the preparation of original reports. (Özgür, et. al. 2009).

Thanks to this application, teacher candidates can have synchronous and asynchronous interaction with their facilitators and they free themselves from the load caused by the photographs, handmade works, story cards, and CD-ROM materials that they add to their files in their activities. For the faculty, this application allows effective use of time and human resources, storing files in the file, and decreases the communication, transportation, management and time costs. In the 2009-2010 academic year, 674 mentor teachers and 40 academic facilitators served to 4,810 students in the implementation courses in 252 preschools in 81 cities. The number of active participants of the e-portfolio portal is 8,168 for 2009-2010.

The e-portfolio applications at Anadolu University open and distance education system is important in that it is the first in Turkey in terms of the evaluation of teacher candidates trained through distance education and it will shed insight into the studies in this field.

THE MANAGEMENT ASPECT OF THE E-PORTFOLIO

The organization structure of the e-portfolio system, the parts involved in the management process, and the characteristics of the communication channels among the students are the major factor for a successful e-portfolio application.

Guo ve Greer (2005) emphasized that e-portfolios are not only learning and assessment activities; also they have positive effects among student-teacher and students-student communication and collaboration. Moreover, Özgür et. al. (2009) stated that e-portfolio applications not only improve collaboration between student-student and student-teacher, at the same time they improve co-operation among teachers as its employees. Additionally, researches stated that teachers develop different but positive attitudes toward the effective evaluation of teaching process with the use of e-portfolios (Heath 2002; Napper and Barrett, 2004; Klett, Wright and Kennedy, 2003; Wade, Abrami and Sclater, 2005).

Benefiting from all these advantages is only possible through determining how to perform the assessment activities, and how to publish them on the portal in parallel with the goal and vision of the institution. Departing from this approach in planning and realizing the e-portfolio application, Anadolu University first shaped the management aspect of the application in line with its vision and goals.

In the scope of the Open Education Faculty Pre-school Teaching BA Program (PSTTP) application courses carried out in cooperation between Anadolu University Rectorship and Ministry of Education. Anadolu University is represented by PSTTP Implementation and Academic Coordinatorship while Ministry of Education is represented by Provincial Coordinators, School Coordinators and Mentor teachers. It is essential that faculty coordinators, school coordinators and mentor teachers work in close cooperation in evaluating PSTTP implementation activities with traditional methods. Moreover, the teacher candidate should perform his duties and responsibilities in cooperation with his mentor teacher. The relationships between the individuals involved in the traditional implementation process are given below in Figure 1.

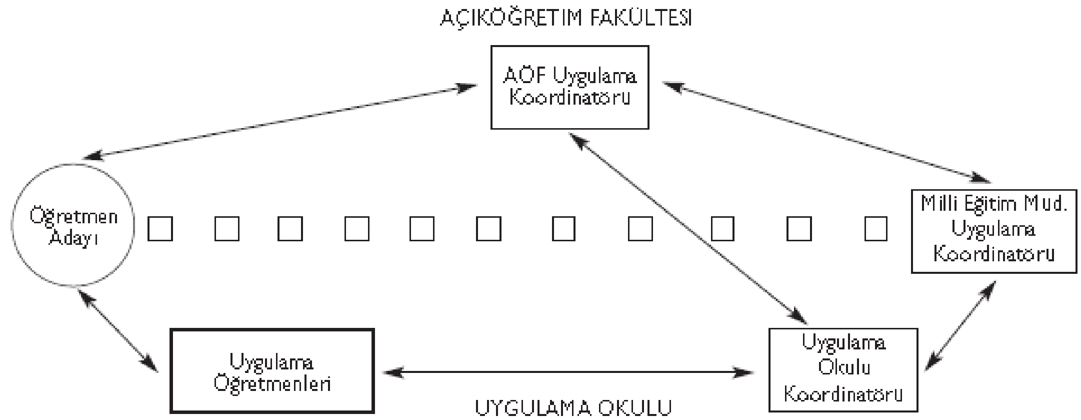

Figure 1. The Diagram for the Traditional Process of OEF PSTTP Implementation Courses

A similar structure was set for the e-portfolio implementation within the scope of PSTTP implementation lessons. When the steps followed for transporting the portfolios to the OEF Coordinatorship were abolished, the problems faced by Provincial Implementation Coordinators, School Implementation Coordinators and OEF offices were removed. In terms of management, this change in the cooperation between Anadolu University and Ministry of Education has affected management, communication and education dimensions.

OEF implementation Coordinatorship, mentor teachers and academic facilitators actively take part in the implementation of e-portfolio. In this respect, OEF Coordinatorship is responsible for the organization of the implementation courses and the management of the e-portfolio system. The mentor teacher has to:

- plan the activities that the teacher candidate will perform on the e-portfolio portal,
- mentor the teacher candidates both in classroom and on the Internet,
- evaluate the studies of the teacher candidates weekly, and
- transfer the results of evaluation to the OEF Coordinatorship through the portal.

Academic facilitators represent the faculty for the guidance and counseling service. In this respect, they have to:

- evaluate the studies of the teacher candidates weekly, and
- transfer the results of evaluation to the OEF Coordinatorship through the portal.

Figure 2 shows the current organizational/hierarchical structure for the implementation courses performed with e-portfolio and the communication and interaction channels between the individuals involved in the management of the e-portfolio system.

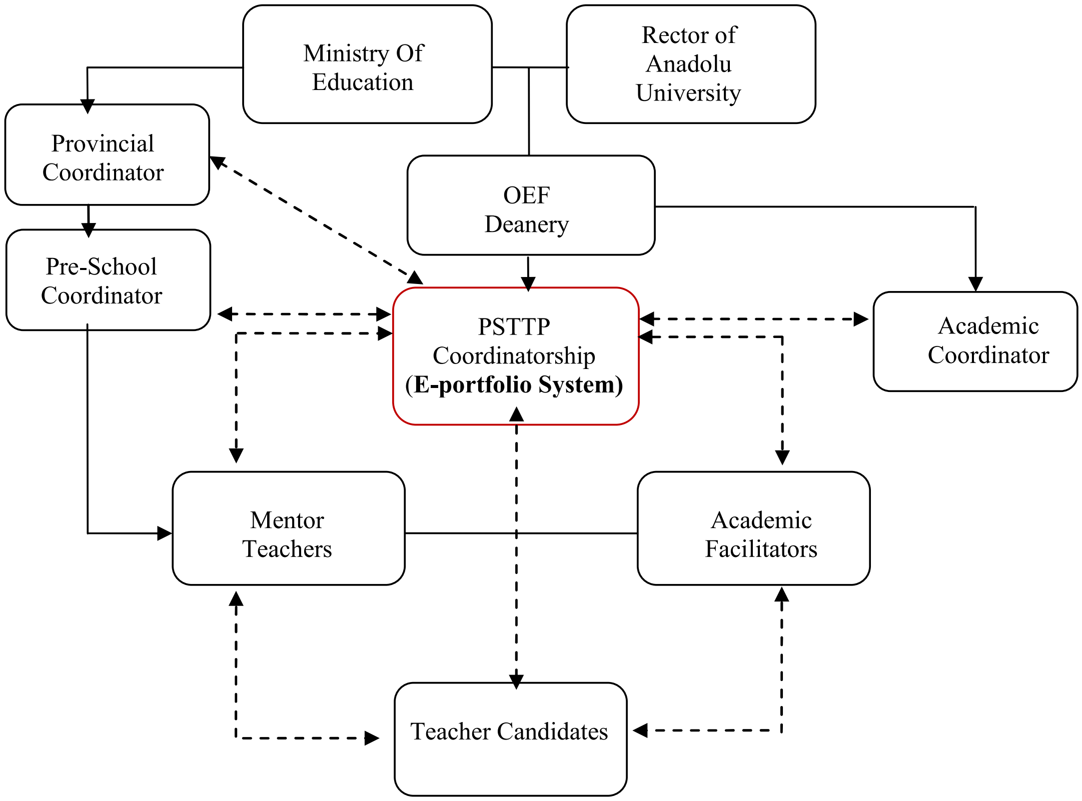

Figure 2. Organizational Structure for E-Portfolio System

The communication and interaction relations defined with lashes in Figure 2 are complex processes which require very good planning in terms of management. Synchronous and asynchronous interactive communication environments provides fast, effective and economic service to the teacher candidates, and offers individual support opportunity for them to cope with the isolation feeling usually encountered in distance education systems. Teacher candidates can directly contact with PSTTP Coordinatorship, mentor teachers and academic facilitators in the e-portfolio implementation. The implementation of academic consultancy not available in the traditional style is effective in removing the isolation feeling of the teacher candidates and enriching the consultancy services for professional development.

A student-centered structure was targeted in the communication dimension of the e-portfolio implementation, and student-student, student-mentor teacher, student-academic facilitator and student-institution interaction were included on the portal. OEF Implementation Coordinatorship is responsible for providing coordination between all the institutions and individuals involved in the implementation courses, and it is in the junction point of all the communication channels. The control and management of the processes between the parties with a communication channel and the coordination between the parties without a communication channel are realized by OEF Coordinatorship.

In the e-portfolio implementation process OEF Pre-school Teacher Training Program Academic and Implementation Coordinatorships, Distance Education Department and Computer-Aided Education (CAE) Unit have taken roles. OEF PSTTP Coordinatorships and Distance Education Department were concerned with the education design and content development process of the project while CAE Unit was concerned with the technologic design and application. The stages followed within the scope of design and applications are as follows:

- A Portal was designed using Microsoft Office Sharepoint Server software.
- The duties and responsibilities of the institutions and individuals involved were defined, and published on the portal.

- The academic studies on teacher training and pre-school education were reviewed for the e-library and published on the portal.
- PSTTP Teaching and Exam Regulation was prepared and published on the portal.
- The handbooks on the operation of this implementation were published on the portal.
- The link of Turkish Language Society was presented on the portal in order to help teacher candidates use Turkish language properly when preparing their activity reports.
- The list of students were prepared and published on the portal.
- Assessment Center Handbook was prepared and published on the portal.
- The Assessment Center was designed in two separate parts: one for mentor teachers, the other for academic facilitators.
- The questionnaires prepared to evaluate the effectiveness of the portal and get the views of the participants were given as a link on the portal.
- Discussion Board was designed to enable student-student interaction and communication. Five categories were set to avoid confusion and repetition in the messages. These categories are: (1) Subjects related to activity reports, (2) Technical problems, (3) Suggestions for the system, (4) PSTTP General Issues, and (5) Extracurricular activities.

The procedures followed by the PSTTP Implementation Coordinatorship to carry out the activities through the portal are listed as follows:

- The need for mentor teachers in each city is determined considering the numbers of students in 81 cities all over Turkey. The need for the mentor teachers is sent to Provincial Coordinators who supervise the implementations in cities.
- The Provincial Coordinators are invited to Eskişehir, and information and education activities are held to promote cooperation.
- The kindergartens and mentor teachers are determined for each student in line with the kindergarten and mentor teacher lists submitted by Provincial Coordinators. The residence addresses of the students are taken into consideration for determining the practice schools and mentor teachers. The results are announced on the internet, and sent to the post addresses of the students.
- User names and passwords are formed for the mentor teachers, academic facilitators and teacher candidates. The user names and passwords of teacher candidates are sent to their residence addresses while those of mentor teachers are sent to Provincial Coordinators to submit them.
- The academic facilitators are trained on the use of Portal designed with Microsoft Office Sharepoint Server software and the assessment process.
- The users are defined, their website access permissions are provided, and all the users are given the opportunity to roam on the site within the limits of their access permission. Mentor teachers and academic facilitators are authorized and the technical arrangements are done for them to reach the individual pages of the teacher candidates.
- Technical and educational supports are given for those who encounter e-portfolio implementation for the first time. The individual pages of each teacher candidate are checked to fix the problems faced during uploading the activity reports to the portal.
- The messages posted on the discussion board are checked and answered daily. The “Frequently Asked Questions” section which serves as a brief summary of the messages posted on the discussion board is updated regularly.
- A handbook is prepared for the assessment and grading processes and this handbook is provided to the mentor teachers and academic facilitators.
- Assessment section is activated during midterm exams and final exam to enter the grades of the teacher candidates.
- Guidance visits are paid to the cities with dense teacher candidate population during midterm exams and final exam. The Provincial Coordinator is contacted, and meetings are organized for teacher candidates, mentor teachers and academic facilitators in these cities. As a result of the meetings held, any possible problem is identified, and opinions and suggestions are proposed. These guidance visits are quite important for improving the implementations.
- The grades entered to the portal by the mentor teachers and academic facilitators are checked. If there is any striking difference between the grade of the mentor teacher and academic facilitator, “Assessment Commission” formed by the Coordinatorships examines their personal study fields and reports.
- The grade of a teacher candidate is determined by taking the average of mentor teacher’s grade and academic facilitator’s grade.
- The academic records of the teacher candidates are sent to Computer Center (BAUM) and the results are announced on the internet.

As a conclusion, the management of distance education equals to the control of various processes such as planning, design, production, assessment, access and maintenance. It is necessary to introduce the human resources, processes, and system outcomes/products clearly in order to manage the implementations effectively and successfully. Departing from the viewpoint of Khan (2001, p.106) on distance education in two stages as content development, logistics and support, the human resources, processes and products in the e-portfolio implementation can be expressed as in Figure 3.

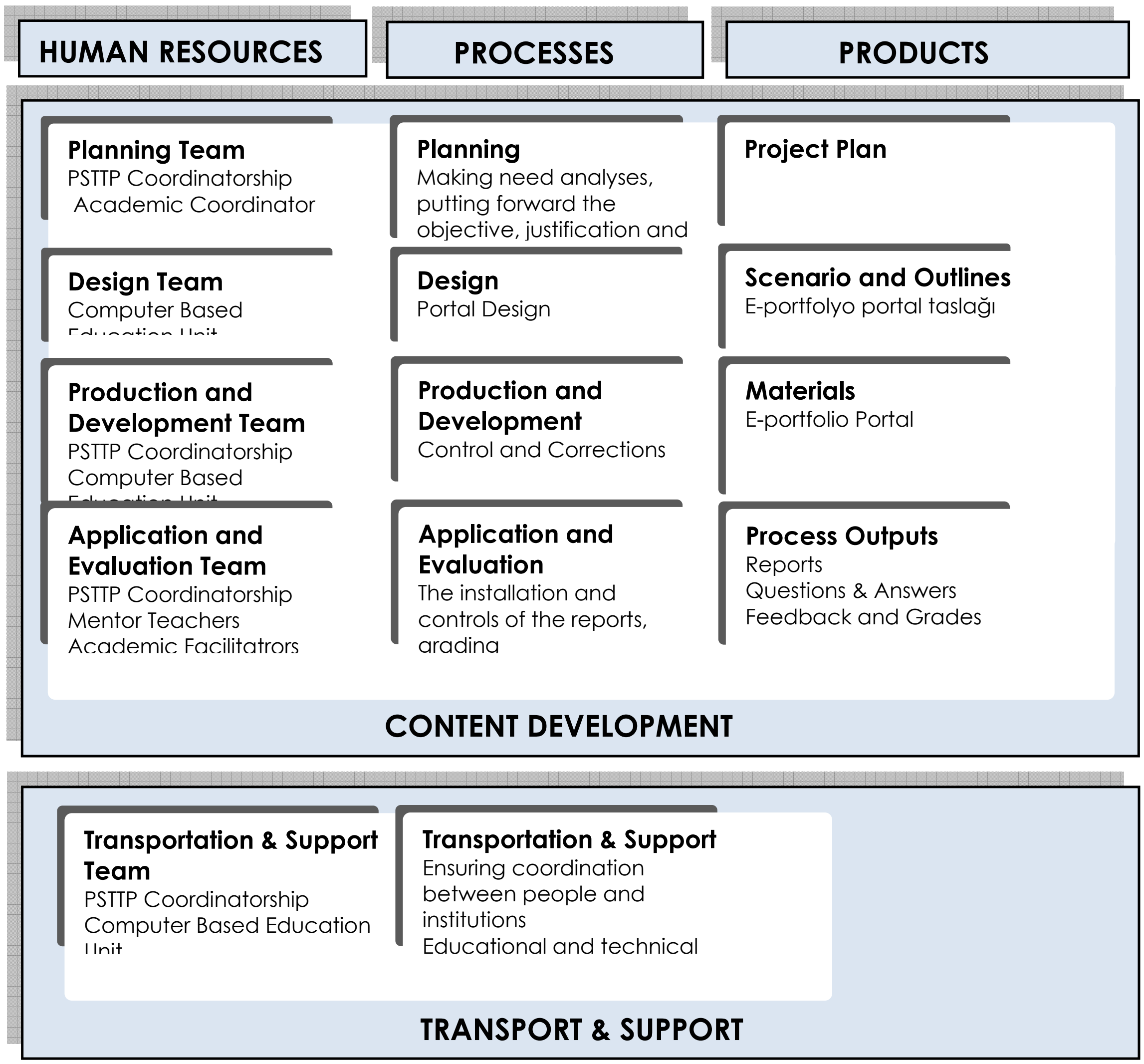

Figure 3. Human Resources, Processes and Products in the E-Portfolio System

CONCLUSION

According to the first assessment reports prepared on the e-portfolio implementation, which is used as a means to enhance the knowledge of the teachers, at the end of 2008-2009 academic year, the teachers and students report that this system has brought dynamism, order, plan and interaction to their studies. In this respect, it is obvious that e-portfolio implementation continues successfully and with the positive views of the parties. Therefore, it is aimed to make the use of e-portfolio implementation more common, develop and better this implementation in the light of the system participants' (i.e. teacher candidates, mentor teachers, academic facilitators, support team, coordinators, and so on) opinions, suggestions and criticisms.

In distance education implementations which will be shaped in line with the decisions taken, it is essential to determine the decision makers appropriately, and make the plans systematically within the decisions. In other words, a managerial process which covers planning to realize the management policies, relating the activities to the institutional mission and vision, and evaluating them is experienced in distance education institutions. During this process, it is expected that the managerial decisions (i.e. program/course design and selection, technology selection, teaching method selection, so on.) are effective and efficient in many stages. Today's distance education institutions require technology-based distribution systems which do not necessitate traditional academic structuring and complex programs and implementations development support systems. In other words, cooperation of experts from different disciplines, in this case a different structuring, is required to create a high quality distance education system. It is the same for the e-portfolio practice which stands among the distance education implementations. Especially, change in managerial understanding and structuring is required to improve the e-counseling system, one of the corner stones of e-portfolio implementation. In parallel with all these expectations and goals, developing and spreading the e-portfolio implementations which require constant evaluation and analysis of drawbacks and advantages will contribute to the structuring of the assessment process in distance education providing a more functional, active and faster participation.

REFERENCES

Abrami, P. & Barrett, H. (2005). Directions for Research and Development on Electronic Portfolios. *Canadian Journal of Learning and Technology*, 31(3), Web:http://www.cjlt.ca/content/vol31.3/abrami.html (Date:28.12.2010)

Açıköğretim Fakültesi, (2009). *Açıköğretim Sisteminin Tanıtımı*. Web:http://www.anadolu.edu.tr/aos/aos_tanitim/aos.aspx (Date:12.12.2010)

Ahn, J. (2004). Electronic Portfolios: Blending Technology, Accountability & Assessment. *T.H.E. Journal*, 31(1), 12-18. (EJ708092) Web:http://thejournal.com/articles/16706 (Date:17.11.2010)

Çekerol, K. & Şenel, H.G. (2008). Açıköğretime Kayıt ve İnternet. *8th International Educational Technology Conference* (IETC 2008-May), Eskişehir, Türkiye.

Galloway, J. (2001). Electronic Portfolios (EP): A "How To" Guide. In C. Crawford et al. (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference,* pp. 582-587. Chesapeake, VA: AACE.

Guo, Z., & Greer, J. (2005). Connecting E-Portfolios and Learner Models. In G. Richards (Ed.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education,* pp. 2075-2080. Chesapeake, VA: AACE.

Heath, M. (2002). Electronic Portfolios for Reflective Self-Assessment. *Teacher Librarian*, *30*(1), 19-23.

Karaca, E. (2003). Öğretimde Öğrenci Başarısının Değerlendirilmesi. *Anadolu Üniversitesi Eğitim Fakültesi Dergisi* 3(2), 129-140

Khan, Badrul H. (2001). A Framework For Web-Based Learning. (Ed: Badrul H. Khan: *Web-Based Learning*). Educational Technology Publications, Inc., Englewood Cliffs , New Jersey

Klett, M., Wright, V., & Kennedy, T. (2003). Electronic Portfolios: A Tale of Two Institutions' Experiences and Reflections. In C. Crawford et al. (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference, pp.2267-2268*. Chesapeake*, VA: AACE.*

Napper, V. & Barrett, H. (2004). Assessment and E-Folios Issues. In C. Crawford et al. (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference*, *pp. 39-40.* Chesapeake*, VA: AACE.*

Reinhartz, J. & Beach, D. (1999). Electronic Portfolios in Science for Professional Development and Student Assessment. In *Proceedings of International Conference on Mathematics / Science Education and Technology*, pp. 455-456. AACE.

Rogers, G. M. & Chow, T. (2000). Electronic Portfolios and the Assessment of Student Learning**.** *Assessment Update*, 12(1), 4-6.

Selvi, K. (1998). Üniversitelerde Uygulanan Başarı Değerlendirme Yaklaşımları. *Kurgu Dergisi* 15, 336-345

Ozgur, A. Z., Kaya, S. ve Diğerleri (2009). *Anadolu Üniversitesi Açıköğretim Fakültesi Okulöncesi Öğretmenliği Lisans Programı Okulöncesi Eğitimde Uygulama Dersinde Eportfolyo Yönteminin Uygulanabilirliği.* Anadolu Üniversitesi Bilimsel Araştırma Projeleri Proje No: 07073, Eskişehir

Tuttle, H.G. (2007). Digital-Age Assessment: E-Portfolios Are The Wave Of The Future. *Technology & Learning*, 27(7), 22.

Wade, A., Abramı, P.C., & Whıte, B. (2006). Using Electronic Portfolios To Help Students Become Self-Regulated Learners. *The Canadian Resource for School-Based Leadership*, 14(2), 23-25.

THE RELATIONSHIP BETWEEN SOCIAL COHESION AND COMPUTER-INTERNET USAGE

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ABSTRACT
The aim of this study is to analyze the relationship between social cohesion and computer-internet usage among university students. The research was conducted among university students in North Cyprus. The sample for the research consists of 38.8% (n=80) female, 61.2 % (n=126) male, 206 university students by using the criterion sampling method. "Hacettepe Personality Inventory – Social Cohesion Scale" developed by Özgüven (1992) and Biographic-Demographic Information Form was used as a collecting data. Percentage documentation average, ANOVA and Pearson Moment's correlation were figured out in data analysis in this study. The results of this study showed that there is a significant correlation between social cohesion as social relations and the computer usage of the university students. There is significant correlation between social cohesion as family relations, social relations, social norms and antisocial tendency with each other.
Keywords: Social cohesion, computer usage, internet usage, cohesion, internet.

INTRODUCTION

Recent years have witnessed a growing awareness of the potential impacts of computer and internet usage on the structures and dynamics of the society. Since the turn of the decade, researches have made much progress in establishing solid evidence of the often highly complex ways in which the take-up and computer-internet usage has initiated, enabled or fostered processes of social change. In face to face interaction you may find people smiling, frowning and nodding while computers have no social feedback. Computer technology affects the people's awareness of themselves, relationships with others and the world (ref. Zanden, 1990).

Social cohesion is a "we feeling" that members of a group are bound together, such as by attraction for one another (Myers, 1993). According to Durkheim, religion confirms to social values to the people and it is contributing of social cohesion. Religion, education and family life all help to improve social cohesion and strengthen the collective conscience (Tischler, 1996; Giddens, 1997; Marsh, 2000).

The concept of social cohesion refers to the capacity of an individual to establish good relations with his/her environment and to continue such relations. The family relations reflect the level of harmony of the individual with his/her relations with their family. The social relations determine the characteristics of the individual's relationships with others. The social norms do not only measure the legal obligations of an individual, but also the social rules and values; respecting others rights and realizing his/her own requirements independently in parallel with the society. The antisocial tendencies refer to the characteristics of individuals indicating anger, fury, revenge and violence (Özgüven, 1992; ref. Yücel, 2007).

Cohesion behavior is defined as the degree of meeting the individual's personal independence and social responsibility. Depending on the degree of their lives the individual develops more effective attitudes depending on his/her life. All these behaviors occur in the form of a chain. Behavior in itself is a chain process that contains both cognitive and behavioral elements (ref. Toy, 2006). Especially, the age of adolescence is described as years of social development and cohesion. Social cohesion recovered over time but it develops some experiences in adolescence (Yavuzer, 1995).

The need to spend increasing amounts of time on computer activities such as playing games, arranging files or participating in online discussion groups are indicated by psychological tolerance. Computer users are aware of this problematic behavior but they continue to use the computer compulsively. When a person is unable to access a computer they showed that withdrawal symptoms are indicated by an increase in irritability and anxiety (ref. Orzack, 1998).

According to the Young in 1996, there are lots of negative consequences of addictive use of the computer and internet, such as familial problems, academic problems and occupational problems. The context of relationship problems caused by internet addiction has been undermined by its current popularity and advanced utility.

Patients will spend less time with people in their lives and the serious relationship problems were reported by addict's surveyed (ref. Aslanbay, 2006).

Computer and internet usage, which is defined as a new type of addiction, became an important study area that attracts the interest of different disciplines including psychology, sociology and communication (Balcı, Gülnar, 2009). The present study was conducted to determine the social cohesions of students depend on computer and internet usage. In this respect the results of this study will light the way for researches of academics, educational program developers, managers, educators etc.

The Aim of the Study
The purpose of this study is to analyze the relationship between social cohesion and computer-internet usage among university students.

The Problem Statements of the Study
The main problem statement of the study: "Is there any statistical meaningful correlation between social cohesion and internet-computer usage among university students?" The following sub-questions were answered in order to reach the result of the main problem.

1. Is there any statistical meaningful correlation between computer usage and social cohesion?
2. Is there any statistical meaningful correlation between internet usage and social cohesion?
3. Is there any statistical difference between social cohesion and duration of computer usage?
4. Is there any statistical difference between social cohesion and duration of internet usage?

RESEARCH METHODOLOGY

Research Design
The research was made by descriptive type of associational research method. The aim of the descriptive perspective is to determine related cases. This type of research aimed to evaluate the level and the variation together between two and more variables (Karasar, 2009).

The Universe and Sample of the Study
The universe of this research is consists of university students in North Cyprus. The sample for the research consists of 38.8% (n=80) female, 61.2 % (n=126) male, 206 university students used by purposive sampling techniques of criterion sampling method. The students have their own personal computer set as criteria.

Instruments
In the collection of data "Hacettepe Personality Inventory (HKE) – Social Cohesion Scale" and Biographic-Demographic Information Forms were used. Biographic and Demographic Information Form is prepared by the researchers and it is arranged according to the suitability with the aims of the study. It is formed of 17 questions. In this form people are subjected to demographic features and computer-internet related questions. "HKE – Social Cohesion Scale" which has four subscales was developed by Özgüven. The mean of Cronbach's alpha reliability coefficient of these subscales was .82. These subscales are family relations, social relations, social norms and antisocial tendencies. Family relations reflect the individual's relationships with his/her family. A high family relation scores indicates that s/he has a friendly and healthy relationship with his/her family. Family relations in the low score show the confusion and inconsistency in its dealings with the individual's family. Social Relations subscale reflects the individual's nature of its relations with others. A high social relations score indicates that the individual adopts a flexible attitude within the society and that s/he exhibits acceptable behaviors. In terms of social relations score is high indicates a high level of the individual's maturity and social skills. These people are happy and comfortable in groups of friends and other adults give an outlook. In the lower scores indicate that the individual's means that stagnant in terms of socialization and social skills. Social norms subscale determines the mandatory conditions to be considered legal and social rules and values of society means being respectful of the rights of others. The high score of social norms indicate that personal desires may be delayed according to the needs of the group's and also meets the individual's understanding of the rights of others. Antisocial tendencies to the low score indicates that an individual with antisocial aptitudes. Antisocial tendencies subscale determines the characteristics of individual indicating anger, fury, revenge and violence. A higher score indicates that the individual does not possess antisocial tendencies (Özgüven, 1992).

Hacettepe Personality Inventory has a reliability subscale. A higher score of reliability subscale indicates that the individual carefully read each item to respond to reviews with insight and conscious, paper fill out a reliable of the inventory answering behavior. In practice, if the reliability score of answer sheet is lower than 5 it is counted as invalid and it is not included in scoring (Özgüven, 1992).

Data Analysis
All analysis are performed by using the SPSS 15.0 for Windows. Considering purposes of the study percentage documentation average, ANOVA, Pearson moment's correlation were figured out in data analysis. The statistical significance level was accepted as .05 in the study.

RESULTS
In this study, the following results were found according to the problem statement and sub-questions of the study.

The first and second sub-questions of the research were expressed as "Is there any statistical meaningful correlation between computer usage and social cohesion?" and "Is there any statistical meaningful correlation between internet usage and social cohesion?"

Table 1. Correlation of Social Cohesion Subscales Test Scores with Computer – Internet Usage Scores

	Computer Usage	Internet Usage	Family Relations	Social Relations	Social Norms	Antisocial Tendency	Social Cohesion
Computer usage							
r	1	-.408**	.070	.166*	-.099	.009	.062
n	206	206	206	206	206	206	206
p		.000	.318	.017	.157	.899	.378
Internet usage							
r	-.408**	1	.010	-.089	.068	-.044	-.024
n	206	206	206	206	206	206	206
p	.000		.886	.205	.331	.528	.729
Family Relations							
r	.070	.010	1	.278**	.387**	.472**	.773**
n	206	206	206	206	206	206	206
p	.318	.886		.000	.000	.000	.000
Social Relations							
r	.166*	-.089	.278**	1	.229**	.279**	.646**
n	206	206	206	206	206	206	206
p	.017	.205	.000		.001	.000	.000
Social Norms							
r	-.099	.068	.387**	.229**	1	.334**	.665**
n	206	206	206	206	206	206	206
p	.157	.331	.000	.000		.000	.000
Antisocial Tendency							
r	.009	-.044	.472**	.279**	.334**	1	.743**
n	206	206	206	206	206	206	206
p	.899	.528	.000	.000	.000		.000
Social Cohesion							
r	.062	-.024	.773**	.646**	.665**	.743**	1
n	206	206	206	206	206	206	206
p	.378	.729	.000	.000	.000	.000	

** p<.001 statistically meaningful correlation
* p<.05 statistically meaningful correlation

Pearson Moment's Correlation Test was applied in order to determine whether there is a statistically meaningful correlation between Hacettepe Personality Inventory – Social Cohesion Scale and computer-internet usage scores of the students.

The analysis of the data implies that there was a statistically meaningful mild positive correlation between Social Relations subscale score and computer usage scores (r=.166). Statistically meaningful mild negative correlation was found between computer usage and internet usage scores (r=-.408). There was no statistically meaningful correlation between computer usage and Family Relations (r=.070), Social Norms (r=-.099), Antisocial Tendency (r=.009) and Social Cohesion (r=.062) subscales of HKE Social Cohesion Scale.

There was no statistically meaningful correlation with internet usage scores and Family Relations (r=.010), Social Relations (r=-.089), Social Norms (r=.068), Antisocial Tendency (r=-.044) and Social Cohesion (r=-.024) subscales of HKE Social Cohesion Scale.

There was a statistically meaningful strong correlation with Family Relations and Social Cohesion (r=.773) subscales. Statistically meaningful mild correlation was found between Family Relations and Social Relations (r=.278), Social Norms (r=.387) and Antisocial Tendency (r=.472) subscales. It was determined statistically meaningful moderate correlation with Social Relations and Social Cohesion (r=.646) subscales. Statistically meaningful mild correlation was found between Social Relations and Social Norms (r= .229) and Antisocial Tendency (r=.279) subscales. There was statistically meaningful moderate correlation between Social Norms and Social cohesion (r=.665) subscales. Statistically meaningful mild correlation was found between Social Norms and Antisocial Tendency (r=.334). It was determined statistically meaningful moderate correlation between Antisocial Tendency and Social Cohesion (r=.743) subscales of HKE Social Cohesion Scale.

The third sub-question of the research was expressed as "Is there any statistical difference between social cohesion and duration of computer usage?"

Table 2. Comparing Student's Duration of Computer Usage with Social Cohesion Subscales Scores

Subscales	Computer Usage Duration	n	$\bar{X}$	sd	df	F	p
Family Relations	No daily usage	15	15,66	2,60	4		
	1-3 hours	18	14,38	3,69			
	4-5 hours	72	13,37	3,73	201	1,578	,181
	6-8 hours	60	13,28	3,85			
	8 hours and above	41	13,70	3,50			
	Total	206	13,66	3,67	205		
Social Relations	No daily usage	15	14,60	3,24	4		
	1-3 hours	18	12,72	3,46			
	4-5 hours	72	12,59	3,67	201	1,800	,130
	6-8 hours	60	13,78	3,57			
	8 hours and above	41	13,75	3,26			
	Total	206	13,33	3,54	205		
Social Norms	No daily usage	15	11,93	2,68	4		
	1-3 hours	18	12,50	2,79			
	4-5 hours	72	12,31	2,92	201	,736	,568
	6-8 hours	60	12,13	2,70			
	8 hours and above	41	11,43	3,20			
	Total	206	12,07	2,88	205		
Antisocial Tendency	No daily usage	15	11,40	3,18	4		
	1-3 hours	18	11,55	3,18			
	4-5 hours	72	10,59	3,56	201	,409	,802
	6-8 hours	60	10,98	3,37			
	8 hours and above	41	10,75	3,47			
	Total	206	10,88	3,41	205		
Social Cohesion	No daily usage	15	53,60	8,90	4		
	1-3 hours	18	51,16	9,88			
	4-5 hours	72	48,88	9,79	201		,491
	6-8 hours	60	50,18	8,98		,857	
	8 hours and above	41	49,65	10,11			
	Total	206	49,96	9,56	205		

One-Way ANOVA analyze was applied in order to determine whether there is statistically meaningful difference to the daily computer usage duration according to Social Cohesion's sub-scales.

The results showed that there was no significant difference to the computer usage duration during a day to the no daily usage ($\bar{X}$=15.66 ± 2.60), 1-3 hours ($\bar{X}$=14.38 ± 3.69), 4-5 hours ($\bar{X}$=13.37 ± 3.73), 6-8 hours ($\bar{X}$=13.28 ± 3.85), 8 hours and above ($\bar{X}$=13.70 ± 3.50) and Family Relations subscale scores (p=.181). There was no significant difference to the computer usage duration during a day to the no daily usage ($\bar{X}$=14.60 ± 3.24), 1-3 hours ($\bar{X}$=12.72 ± 3.46), 4-5 hours ($\bar{X}$=12.59 ± 3.67), 6-8 hours ($\bar{X}$=13.78 ± 3.57), 8 hours and above ($\bar{X}$=13.75 ±

3.26) and Social Relations subscale scores (p=.130). There was no significant difference to the computer usage duration during a day to the no daily usage ($\bar{X}$=11.93 ± 2.68), 1-3 hours ($\bar{X}$=12.50 ± 2.79), 4-5 hours ($\bar{X}$=12.31 ± 2.92), 6-8 hours ($\bar{X}$=12.13 ± 2.70), 8 hours and above ($\bar{X}$=11.43 ± 3.20) and Social Norms subscale scores (p=.568). There was no significant difference to the computer usage duration during a day to the no daily usage ($\bar{X}$=11.40 ± 3.18), 1-3 hours ($\bar{X}$=11.55 ± 3.18), 4-5 hours ($\bar{X}$=10.59 ± 3.56), 6-8 hours ($\bar{X}$=10.98 ± 3.37), 8 hours and above ($\bar{X}$=10.75 ± 3.47) and Antisocial Tendency subscale scores (p=.802). There was no significant difference to the computer usage duration during a day to the no daily usage ($\bar{X}$=53.60 ± 8.90), 1-3 hours ($\bar{X}$=51.16 ± 9.88), 4-5 hours ($\bar{X}$=48.88 ± 9.79), 6-8 hours ($\bar{X}$=50.18 ± 8.98), 8 hours and above ($\bar{X}$=49.65 ± 10.11) and Social Cohesion scores (p=.491).

The fourth sub-question of the research was expressed as "Is there any statistical difference between social cohesion and duration of internet usage?"

Table 3. Comparing Student's Duration of Internet Usage with Social Cohesion Subscales Scores

Subscales	Internet Usage Duration	n	$\bar{X}$	sd	df	F	p
Family Relations	No daily usage	13	14,92	3,66	4		
	1-3 hours	24	13,12	4,05			
	4-5 hours	76	13,80	3,73	201	,989	,415
	6-8 hours	62	13,17	3,68			
	8 hours and above	31	14,22	3,19			
	Total	206	13,66	3,67	205		
Social Relations	No daily usage	13	13,84	3,15	4		
	1-3 hours	24	12,29	3,56			
	4-5 hours	76	13,42	3,69	201	1,047	,384
	6-8 hours	62	13,11	3,33			
	8 hours and above	31	14,12	3,70			
	Total	206	13,33	3,54	205		
Social Norms	No daily usage	13	11,92	2,81	4		
	1-3 hours	24	12,20	2,63			
	4-5 hours	76	12,31	3,18	201	,441	,779
	6-8 hours	62	12,04	2,75			
	8 hours and above	31	11,51	2,66			
	Total	206	12,07	2,88	205		
Antisocial Tendency	No daily usage	13	10,38	3,92	4		
	1-3 hours	24	10,70	3,35			
	4-5 hours	76	11,11	3,61	201	,308	,872
	6-8 hours	62	10,62	3,46			
	8 hours and above	31	11,16	2,70			
	Total	206	10,88	3,41	205		
Social Cohesion	No daily usage	13	51,07	10,42	4		
	1-3 hours	24	48,33	10,31			
	4-5 hours	76	50,65	9,99	201	,579	,678
	6-8 hours	62	48,96	8,86			
	8 hours and above	31	51,03	9,13			
	Total	206	49,96	9,56	205		

One-Way ANOVA analyze was applied in order to determine whether there is statistically meaningful difference to the daily internet usage duration according to Social Cohesion's sub-scales.

The analysis of the data showed that there was no significant difference to the internet usage duration during a day to the no daily usage ($\bar{X}$=14.92 ± 3.66), 1-3 hours ($\bar{X}$=13.12 ± 4.05), 4-5 hours ($\bar{X}$=13.80 ± 3.73), 6-8 hours ($\bar{X}$=13.17 ± 3.68), 8 hours and above ($\bar{X}$=14.22 ± 3.19) and Family Relations subscale scores (p=.415). There was no significant difference to the internet usage duration during a day to the no daily usage ($\bar{X}$=13.84 ± 3.15), 1-3 hours ($\bar{X}$=12.29 ± 3.56), 4-5 hours ($\bar{X}$=13.42 ± 3.69), 6-8 hours ($\bar{X}$=13.11 ± 3.33), 8 hours and above ($\bar{X}$=14.12 ± 3.70) and Social Relations subscale scores (p=.384). There was no significant difference to the internet usage duration during a day to the no daily usage ($\bar{X}$=11.92 ± 2.81), 1-3 hours ($\bar{X}$=12.20 ± 2.63), 4-5 hours ($\bar{X}$=12.31 ± 3.18), 6-8 hours ($\bar{X}$=12.04 ± 2.75), 8 hours and above ($\bar{X}$=11.51 ± 2.66) and Social Norms subscale scores (p=.779). There was no significant difference to the internet usage duration during a day to the no daily usage

($\bar{X}$=10.38 ± 3.92), 1-3 hours ($\bar{X}$=10.70 ± 3.35), 4-5 hours ($\bar{X}$=11.11 ± 3.61), 6-8 hours ($\bar{X}$=10.62 ± 3.46), 8 hours and above ($\bar{X}$=11.16 ± 2.70) and Antisocial Tendency subscale scores (p=.872). There was no significant difference to the internet usage duration during a day to the no daily usage ($\bar{X}$=51.07 ± 10.42), 1-3 hours ($\bar{X}$=48.33 ± 10.31), 4-5 hours ($\bar{X}$=50.65 ± 9.99), 6-8 hours ($\bar{X}$=48.96 ± 8.86), 8 hours and above ($\bar{X}$=51.03 ± 9.13) and Social Cohesion scores (p=.678).

DISCUSSION

In this study the main aim is to examine the relationship between social cohesion and computer-internet usage in a group of university students who have a personal computer. The social cohesion refers to individually good relations with their environment. "We feeling" is important to socially adaptation and proper social cohesion in the society. The social cohesion improves with religion, education and family. In this study family relations, social relations, social norms and antisocial tendency concepts were used as an explaining social cohesion.

The present study; level of computer-internet usage not severely affected the social cohesion in this group. Especially the computer usage duration is affected social relations. On the other hand the analysis showed that family relations, social relations, social norms, antisocial tendency and social cohesion related with each other. According to Koç's study the internet users who perceive lower social support found it is the easy way to communicate other with online but in reality online social support could worsen interpersonal problems (Koç, 2011).

Milliyetçi studied the relationship between social skills and attitudes towards the internet and his findings shows that there was no statistically meaningful difference between social control, social sensitivity, social expressivity, social skills and the use of internet (Milliyetçi, 2008). Also in this study, statistically meaningful relation was not found between internet usage and social cohesion as a family relations, social relations, social norms and antisocial tendency.

The study average of South Korean students spending 23 hours during a week for gaming and another 1.2 million are probably believed to be at risk for addiction. Therapists worry about the increasing number of student's low school success, dropping out from school to spend time on computers. Internet addiction is resistant to treatment and high relapse risks regrettably (Block, 2008). In this study it was determined that most of the students used 4-5 hours both computer and internet usage during a day. So it is a cause of personal, familial and social problems and shows us probably most of university students to be at risk for computer-internet addiction. In addition to these Koç's findings showed that the student who use six hours internet report that more psychiatric syptoms such as depression, obsession, compulsion, interpersonal sensitivity, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism (Koç, 2011).

CONCLUSION

The present study indicates that computer usage duration was related with the social relations. On the other hand, the findings showed that the internet usage was not related with social cohesion as family relations, social relations, social norms and antisocial tendency. Also denote that the students use computer and internet at least 4-5 hours a day. Many factors enhance computer and internet usage of the university students away from the home that reveals the difficulty of adapting living conditions in North Cyprus. Additionally the students have personal computers, free internet access, over-much free time and lack of parental pressure.

In this study, it was focused on the university students that use their own personal computer and their social cohesion. As related with findings enables us to aware of the effects of computer and internet usage on family relations, social relations, social norms, antisocial tendency and give importance to the relations of students with their parents and environments.

Only adolescents who attend university and who have families with higher socio-economical status and education participated the study. Low socio-economical status of the family, low education may be some other factors related with computer-internet usage and social cohesion, a sample having wide range of these characteristics should be formed. Having a large sample of students with different backgrounds may enable to generalize the results to the community. Therefore the further studies could be applied to other age groups like secondary and high school students, a varity of views may occur.

University students with social cohesion vision accepted by their peers in interpersonal relations, sense of belonging to a group can survive, this is also related to him/her provides positively influence the perceptions, to show positive behavior. Around the individuals who can establish good relations with both personal and social satisfaction by providing a social personality and self-esteem.

REFERENCES

Aslanbay, M. (2006). *A Compulsive Consumption Internet Use Addiction Tendency: High School the Case of Turkish Students.*(Unpublished Master's Thesis). University of Marmara/Institute of Social Sciences, İstanbul.

Balcı, Ş., Gülnar, B. (2009). Üniversite Öğrencileri Arasında İnternet Bağımlılığı ve İnternet Bağımlılarının Profili. *Journal of Selçuk Communication*, 6(1), 5-22.

Block, J. J. (2008). Issues for DSM-V: Internet Addiction. *Am J Psychiatry*, 165(3), 306-307.

Giddens, A. (1997). *Sociology.* UK: Blackwell Publisher Ltd.

Karasar, N. (2009). *Bilimsel Araştırma Yöntemi.* Ankara: Nobel Yayın Dağıtım.

Koç, M. (2011). Internet Addiction and Psychopatology. *TOJET,* 10(1), 143-148.

Marsh, I. (2000). *Sociology: Making Sense of Society.* England: Pearson Education Limited.

Milliyetçi, Ö. (2008). *Mesleki ve Teknik Eğitim Veren Ortaöğretim Kurumlarındaki Öğrencilerin İnternete Yönelik Tutumları ile Sosyal Becerileri Arasındaki İlişkinin İncelenmesi.* (Unpublished Master's Thesis). University of Yeditepe/Institute of Social Sciences, İstanbul.

Myers, G. M. (1993). *Social Psychology.* USA: McGraw-Hill, Inc.

Orzack, H. M. (1998). Computer Addiction: What is it? *Psychiatric Times*, 5(8), 2-3.

Özgüven, İ. E. (1992). *Hacettepe Kişilik Envanteri El Kitabı.* Ankara: Odak Ofset Matbaacılık.

Tischler, H. L. (1996). *Introduction to Sociology.* USA: Holt, Rinehart and Winston, Inc.

Toy, B. (2006). *Sanat Eğitimi Alan ve Almayan 15-17 Yaş Grubundaki Ergenlerin Sosyal Uyumlarının ve Benlik Tasarım Düzeylerinin İncelenmesi*. (Unpublished Master's Thesis). University of Ankara/Institute of Sciences, Ankara.

Yavuzer, H. (1995). *Çocuk Psikolojisi*. İstanbul: Remzi Kitabevi.

Yücel, F. (2007). *Harran Üniversitesi Birinci Sınıf Öğrencilerinin Sigara İçme Durumu ve Kişilik Tiplerine Göre Sigara Bırakma Konusundaki Yaklaşımları*. (Unpublished Master's Thesis). University of Harran/Institute of Health Sciences, Şanlıurfa.

Zanden, J. W. V. (1990). *The Social Experience*: *An Introduction to Sociology.* USA: McGraw-Hill, Inc.

THE RELATIONSHIP BETWEEN STUDENTS' EXPOSURE TO TECHNOLOGY AND THEIR ACHIEVEMENT IN SCIENCE AND MATH

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ABSTRACT
The purpose of this study was to examine the effects of information and communication technologies (ICT) on students' math and science achievement. Recently, ICT has been widely used in classrooms for teaching and learning purposes. Therefore, it is important to investigate how these technological developments affect students' performance at school. The data for this study comes from the 2009 administration of The Programme for International Student Assessment (PISA), an internationally standardized assessment administered to15-year-old students (9th grades) in schools. The sample includes 4996 students in Turkey. Hierarchical linear modeling was used for analyzing the effects of ICT in student and school levels by using ICT-related variables such as technology scores and ICT availability at home, etc. The results indicated that students' familiarity with ICT and their exposure to technology helped to explain math and science achievement gaps between individuals and schools. ICT is an important factor that should be taken into consideration when designing classroom environments.
Keywords: ICT, PISA, technology, achievement, hierarchical modeling

INTRODUCTION

In recent years, computers have been used extensively for various reasons by wide user groups. School-age children use computers for entertainment, communication, and education, etc. Over the past few years, due to improvements in technology, computers and related technologies have become cheaper and more sophisticated. That is why households are both able and willing to buy computers for their children. They hope to give them the chance to become advanced computer users. Lauman (2000) stated that "not only is the number of computers in education growing exponentially, but also the number of computers in the home is growing at a rapid rate" (p. 196). Despite the increase in the number of computers and related technologies, everyone does not have the same access to these technologies: "Media availability varies depending on such things as child's age, gender, race/ethnicity, family socioeconomic status, and so forth" (Roberts et al., 1999, p.9). The economic level of the countries might also affect the availability of media for school-age children either at school or at home.

Parents believe that using computers may increase their children's academic achievement and future job opportunities (Ortiz et. al, 2011); therefore they buy computers with an internet connection to help their children succeed in school (Turow, 1999). Today's computer revolution provides cheaper and better home computers that allow students to practice what they have learned at school (Stock and Fishman, 2010). Although there is an agreement among researchers that computers are useful for learning opportunities, Becker (2000) found that students are more likely to use home computers for entertainment than for school related purposes. There are countless things that can be done with computer applications, and some of these applications might have latent impacts on children's development. For instance, computer games might be considered a waste of time by some parents. However, they may have positive effects on children's cognitive development (Hamlen, 2011; Li and Atkins, 2004). By spending time with the computers, children can learn how to "read and utilize the information on computer screens" (Subrahmanyam et al., 2001, p. 14). Using computers can also improve children's visual attention because some applications require users to keep track of or control many activities at the same time. Durkin and Barber (2002) also found that computer games have positive impacts on adolescents.

Children are not only exposed to technology at home but also at school by new information and communications technologies (ICT). Due to having new computers and related technologies, schools are in need of new technology plans and designs. According to Kozma (2003), "Teachers in many countries are beginning to use ICT to help change classroom teaching and learning, and are integrating technology into the curriculum." (p. 13). "Therefore, it is necessary to develop strategies for students to effectively use computers and advanced communication technologies that can help them to improve their academic performance." (Lee et al., 2009, p. 226). According to analyses of U.S. data (NCES, 2001), teachers' computer use for certain activities at school positively affects students' science achievement. Papanastasiou et al. (2003) argued that students who have available computers at home and in the library have higher levels of science literacy. Lee et al. (2009) found in their study that students who were using computer 1 hour per day had better math scores. Kim and Chang (2010) stated that computer use for math was associated with reducing the achievement gap among different diverse backgrounds. It is obvious that there might be many factors affecting students' science and math performance. Technology is one of these factors; that is why it is important to explore how we can explain students' science and math achievements by looking at their use and accessibility of computers and related technologies, as suggested by Subrahmanyam et al. (2001). Notten and Kraaykamp (2009) stated that science performance is positively affected if there is a positive reading climate and computer availability at home. They also mentioned that "the absence of a television set at home seems to narrow a child's worldview and knowledge of science." (p. 379). According to Attewell and Battle (1999), mathematical performance was positively associated with having a home computer. Dumais (2009) also mentioned that using computers for fun was related to increasing math achievement.

The aim of this study was to investigate how using computers and related technologies affect science and math performance among students.

METHOD

The data for this study come from the 2009 assessment of The Programme for International Student Assessment (PISA) that is an internationally standardized assessment jointly developed by participating economies and administered to 15-year-olds (9^{th} graders) in schools. PISA assesses the domains of reading, mathematical and scientific literacy that is covered not merely in terms of mastery of the school curriculum, but in terms of important knowledge and skills needed in real life. Besides assessing these specified domains, PISA includes student, parent and school surveys to gather information on various social, cultural and economic factors such as students' and parents' background, and their attitudes towards ICT. The sample includes 4996 students (male=2551, female=2445) from 170 schools in Turkey. One hundred sixty nine of 170 schools were public schools while there was only one privately funded school in the sample. Student level variables were obtained from the PISA 2009 student and ICT survey, and school-related variables were obtained from the PISA 2009 school survey.

Obtaining Technology Scores

To quantify students' exposure to technology, the questions in the PISA Student & ICT Survey were used. The survey includes questions about several topics such as students' possession of technological devices and how frequently they use these devices at school and home.

The technology scores from the ICT survey were obtained using the Graded Response Model that is a polytomous item response theory (IRT) model developed by Samejima (1969) for analyzing cognitive processes. The model is similar to the Birnbaum's (1968) two-parameter IRT model in terms of dichotomization process. In Graded Response Model, the response categories (k) are dichotomized into two categories: (1) greater or equal to score category k; (2) less than score category k. With k response categories, there are k - 1 or j boundaries between the categories. For each between-category boundary, an operating-characteristic curve is estimated. These curves can be found by using the following equation:

$$P_{ij}^{*} = \frac{e^{a_i(\theta - b_{ij})}}{1 + e^{a_i(\theta - b_{ij})}}$$

where P_{ij}^{*} is the probability of selecting category j or higher, a_i is the item discrimination for item i, θ is the latent trait, b_{ij} is the category-boundary parameter (threshold) for category j in item i. For k response categories, k-1 (or j) category-boundary parameters (b_{ij}) are estimated. These parameters basically represent the ability level necessary to have a 50% chance of responding in a category above the j^{th} between-category boundary. In the present study, the ICT survey items have either four or five response categories that provide three and four between-category boundaries, respectively. Using the given formula, a technology score representing students' familiarity and confidence with ICT is estimated for each student.

Hierarchical Data Analysis

In this study, hierarchical linear modeling (HLM) was used for analyzing the effects of technology on students' achievement. HLM focuses on the effects of social variables on behavior or performance. It allows examining the variance in hierarchical data structures where students are nested within classes and schools. The relative variation in the outcome measures, between students within the same school and between schools can therefore be evaluated.

For hierarchical linear modeling, *lme4* package (Bates, Maechler & Bolker, 2007) in R was used. Before conducting HLM analyses, several assumptions were addressed to determine the adequacy of the hierarchical modeling. To see if student-level residuals are normally distributed, a histogram of observed residuals was generated. If the distribution resembles a normal distribution, it can be concluded that the level-1 errors are normally distributed (Raudenbush & Bryk, 2002). Second, multivariate normality of the school-level residuals was checked by examining the Q-Q plot of expected and observed Mahalonobis distance. A 45 degree line is the evidence of the multivariate normality of the level-2 residuals. Also, homogeneity of level 1 variance was checked. There were four hierarchical models fitted by using math and science scores as an independent variable and independent variables such as technology scores (TECH), socioeconomic status (SES), ICT use at home (ICTHOME), confidence in using computers (HIGHCONF), school size (SCHSIZE) and ratio of computers at school and school size (RATCOMP). The same models were fitted for both math and science scores. Table 1 gives a summary of the HLM models used for the data analysis.

Table 1: *Hierarchical linear models used for data analysis*

One-way random effects ANOVA

$$Y_{ij} = \beta_{0j} + r_{ij} \qquad \text{(Level 1 – Students)}$$

$$\beta_{0j} = \gamma_{00} + u_{0j} \qquad \text{(Level 2 – Schools)}$$

Random intercept model: Model 1

$$Y_{ij} = \beta_{0j} + \beta_{1j}(TECH) + \beta_{2j}(SES) + r_{ij}$$

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

$$\beta_{1j} = \gamma_{10}$$

$$\beta_{2j} = \gamma_{20}$$

Random intercept model: Model 2

$$Y_{ij} = \beta_{0j} + \beta_{1j}(TECH) + \beta_{2j}(SES) + \beta_{3j}(\mathrm{ICTHOME}) + \beta_{4j}(\mathrm{HIGHCONF}) + r_{ij}$$

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

$$\beta_{1j} = \gamma_{10}$$

$$\beta_{2j} = \gamma_{20}$$

$$\beta_{3j} = \gamma_{30}$$

$$\beta_{4j} = \gamma_{40}$$

Random intercept model: Model 3

$$Y_{ij} = \beta_{0j} + \beta_{1j}(TECH) + \beta_{2j}(SES) + \beta_{3j}(\mathrm{ICTHOME}) + \beta_{4j}(\mathrm{HIGHCONF}) + r_{ij}$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(SCHSIZE) + \gamma_{02}(RATCOMP) + u_{0j}$$

$$\beta_{1j} = \gamma_{10}$$

$$\beta_{2j} = \gamma_{20}$$

$$\beta_{3j} = \gamma_{30}$$

$$\beta_{4j} = \gamma_{40}$$

Note: Y_{ij} is students' math or science score in the 2009 administration of PISA.

RESULTS

First, HLM model assumptions were checked. A histogram of observed residuals was generated. The distribution was fairly normal (see Figure 1). Multivariate normality of the school-level residuals was checked by examining the Q-Q plot of expected and observed Mahalonobis distance. The plot had a 45 degree line between two variables for both math and science (see Figure 2). That was the evidence of the multivariate normality of the level-2 residuals. Lastly, homogeneity of level 1 variance was checked by using chi-square test. The test result showed that the hypothesis of homogenous variance was failed to reject (p > 0 .05).

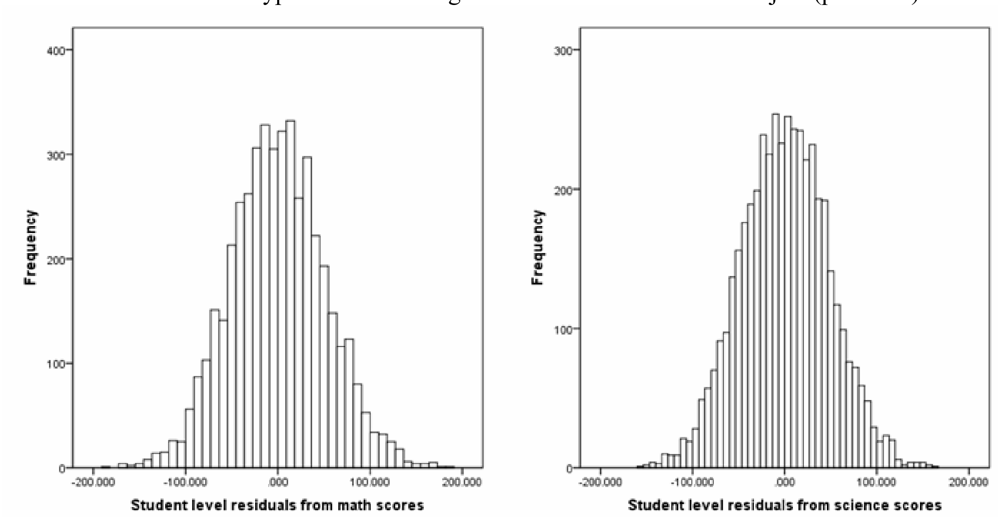

Figure 1. Distributions of student-level residuals of math (left) and science (right) scores

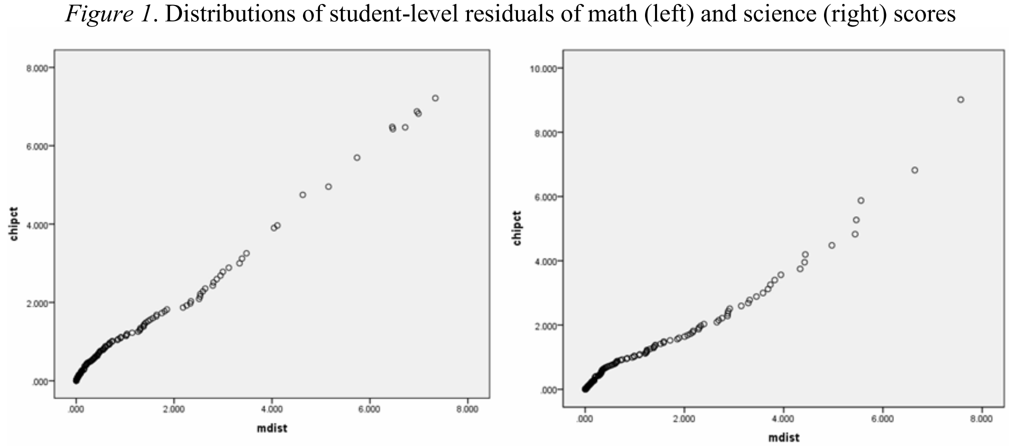

Figure 2. Q-Q plots of observed and expected school-level residuals in math (left) and science (right) scores

After checking model assumptions, the HLM analyses were performed. Table 2 shows the results of the HLM analyses. As mentioned earlier, the first model is the one-way random effects model that accounts for variance between individuals and schools without any covariate. This model was used as a baseline for comparison with other three models that include several covariates in level 1 (student) and level 2 (school). In each step, technology-related variables were included in the model. Intraclass correlations (ICC) were calculated in model 1 for both math and science scores by finding the ratio of level 2 variance to the total variance (i.e. Level 2 variance / Level 1 variance + Level 2 variance). The ICCs were .62 and .67 for science and math scores, respectively. These ICCs showed that 62% variability in science scores and 67% variability in math scores can be explained by the variability between schools. These results indicated that there was a huge achievement difference between the schools in Turkey sample of PISA. The next models were used to explain these achievement gaps between schools by adding ICT-related variables to the models.

Technology scores obtained from the ICT survey was not a strong predictor of science and math scores by itself. However, when it was used with other ICT-related variables, it was a significant predictor in all three models. The availability of ICT at home (ICTHOME) and confidence in using computers (HIGHCONF) were other important predictors of math and science performance in addition to the technology scores. Model 3 included two additional variables in school level: school size (SCHSIZE) and ratio of computers at school and school size (RATCOMP). Both variables were not statistically significant.

Table 2: *A summary of fixed and random effect estimates from four HLM models*

Fixed Effect	**One-way Random Effects**		**Model 1**		**Model 2**		**Model 3**	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept (γ_{00})	444.909 (S) 435.047 (M)	4.921 5.923	455.4318 (S) 449.7068 (M)	4.5838 5.4447	457.0184 (S) 451.0112 (M)	4.5646 5.4386	490.3880 (S) 489.1635 (M)	10.9657 13.1730
TECH (γ_{10})	- -	- -	3.5069 (S) 3.4073 (M)	1.0549 1.1307	8.7179 (S) 8.7283 (M)	1.4145 1.5144	8.635213 (S) 8.6464 (M)	1.4148 1.5147
SES (γ_{20})	- -	- -	9.2202 (S) 12.4057 (M)	0.7782 0.8348	7.5709 (S) 10.5984 (M)	0.8545 0.9152	7.5818 (S) 10.6041 (M)	0.8544 0.9151
ICTHOME (γ_{30})	- -	- -	- -	- -	2.6854 (S) 2.6793 (M)	0.9251 0.9905	2.6912 (S) 2.6794 (M)	0.9251 0.9904
HIGHCONF (γ_{40})	- -	- -	- -	- -	5.6896 (S) 6.2660 (M)	0.7128 0.7630	5.6766 (S) 6.2532 (M)	0.7128 0.7629
SCHSIZE (γ_{01})	- -	- -	- -	- -	- -	- -	-0.0208 (S)* 0.0235 (M)*	0.0070 0.0084
RATCOMP (γ_{02})	- -	- -	- -	- -	- -	- -	-63.081 (S)* -73.827(M)*	25.1399 30.1966

Fit Statistics	**One-way Random Effects**	**Model 1**	**Model 2**	**Model 3**
Variance estimates				
Level 1 variance (r_{0j})	2415.8 (S) 2822.8 (M)	2353.6 (S) 2701.7 (M)	2280.3 (S) 2611.0 (M)	2280.8 (S) 2611.0 (M)
Level 2 variance (u_{0j})	3986.8 (S) 5811.5 (M)	3308.4 (S) 4735.5 (M)	3221.7 (S) 4658.1 (M)	3000.2 (S) 4379.4 (M)
Deviance	53740 (S) 54554 (M)	53275 (S) 53996 (M)	51049 (S) 51734 (M)	51039 (S) 51724 (M)
df	3	5	7	9

Note: In each cell, the first value (top) is based on science scores (S), and the second value (bottom) is based on math scores (M).
(*) The coefficient is not significant at the alpha level of .05

In the bottom of Table 2, deviance values and degrees of freedom were reported for each level in each model. Deviance values can be used for comparing fitted-models. The difference between deviance values from two models and the difference between degrees of freedom from the same models can be used as a chi-square test (e.g. $\chi^2 = \text{Deviance}_{model1} - \text{Deviance}_{model2}$, $df = df_2 - df_1$). Based on these comparisons, it was concluded that all models explained significantly more variance than the one-way random effects model which shows that the additional variables related to ICT were helpful to explain the achievement difference among students and schools.

CONCLUSION

The aim of this study was to explain students' science and math achievement by looking at their use and accessibility of computers and related technologies, as suggested by Subrahmanyam et al. (2001). The results of this study indicated that students' exposure to ICT at home and school was a strong predictor of their math and science performance. Students' exposure to ICT out of school time had a larger impact on their math and science achievement than their exposure to ICT at school. This might point out the lack of the integration of ICT into classroom instruction at schools. Ziya et al. (2010) stated that students' using computers in line with their needs, parents' controlling the time their children use computers, the internet and computer for entertainment purposes can be beneficial. The results of this study showed that ICT usage had a positive impact on students' math and science performance in PISA.

In this study, technology usage at school was found to be a weak predictor of math and science achievement. However, previous research showed that it may have still indirect impacts. Eskil et al. (2010), for example, indicated that some classroom activities have positive effects on students' computer and technology use. Eskil et al. (2010) also argued that when students have advanced knowledge about computer technologies, they can be more successful in their studies. Therefore, direct and indirect effects of ICT usage at school should be taken into consideration. Also, Kubiatko and Vlckova (2010) found in their study that the amount of time spent using a computer had a positive and strong relation with science knowledge. The findings of this study support this idea. Students' technology use may explain the science achievement gap. The same interpretation can be made for math achievement. Kim and Chang (2010) focused on math achievement gap between students coming from different racial and ethnic backgrounds. They found home computer use reduced the gap in math achievement.

Unlike this study, Aypay (2010) found that there was no significant relationship between students' use of ICT and academic achievement based on the results of PISA 2006. Aypay (2010) indicated that neither very frequent nor very little use of ICT improved student performance in PISA 2006. The 2005 curriculum reform in Turkey might be the main reason of this discrepancy. Turkey revised its curriculum and it has started using a constructivist approach since 2004 (Sahin, 2010). This reform required the integration of computers and other instructional technologies in classrooms. These changes in the curriculum might result in a positive relationship between ICT and student achievement in PISA 2009.

The results of this study are limited to 15-years old students (9^{th} grades) in Turkey. Therefore, the results may not generalize to other age groups or other populations (e.g. students from other countries).

Practical Implications of This Study

Projects for comparing students' achievement such as The Trends in International Mathematics and Science Study (TIMSS), Progress in International Reading Literacy Study (PIRLS), and The Programme for International Student Assessment (PISA) can enable countries to evaluate their system of education and to pursue their students in the fields of mathematics, science and reading by years rather than being projects for competition between countries (Ziya et al., 2010). This study focused on ICT usage and its effects on students' achievement. The findings of this study can be beneficial for educators and policy-makers in education in terms of constructing classroom environments and designing curriculums. Aypay (2010) stated that Turkey first needs to lower the differences among schools. Turkey also needs to improve the use of ICT in educational system by adapting the technology in the content of the courses. Based on the results of this study, it seems that there is still a huge achievement gap between schools in Turkey.

The results of this study can be also useful for comparing participating countries in PISA in terms of ICT usage and its effects on achievement. Previous international comparative studies showed that there are a number of factors influencing Turkish students' performance in comparative examinations such as PISA and TIMMS. Ozgun-Koca & Sen (2002) found that very little use of computers, calculators and other instructional technology, intensive lecturing and note-taking in classrooms, loading students with too much information in the curriculum, and problems associated with measurement and evaluations were the main factors. Askar & Olkun (2005) found that the Turkish students' access to computers in schools was quite low when compared to other OECD countries. The methodology of this study can be repeated using PISA results from other countries, and the results can be used for international comparisons.

REFERENCES

Askar, P. and Olkun, S. (2005). The use of ICT in schools based on PISA 2003 Data. *Eurasian Journal of Educational Research, 19*, 15-34.

Aypay, A. (2010). Information and communication technology (ICT) usage and achievement of Turkish students in PISA 2006. *TOJET: The Turkish Online Journal of Educational Technology*, *9*(2), 116-124.

Attewell, P., & Battle, J. (1999). Home computers and school performance. *Information Society*, *15*(1), 1-10.

Bates, D., Maechler, M. & Bolker, B. (2007). *lme4*: Linear mixed-effects models using S4 classes. R package version 0.999375-39. (http://CRAN.R-project.org/package=lme4)

Becker, H. J. (2000). Who's wired and who's not: Children's access to and use of computer technology. *The Future of Children, 10*(2), 44-75.

Birnbaum, A. (1968). Some latent trait models and their use in inferring an examinee's ability. In F. M. Lord & M. R. Novick (Ed.), *Statistical theories of mental test scores*. Reading, MA: Addison-Wesley.

Dumais, S. A. (2009). Cohort and gender differences in extracurricular participation: The relationship between activities, math achievement, and college expectations. *Sociological Spectrum, 29*(1), 72-100.

Durkin, K., & Barber, B. (2002). Not so doomed: Computer game play and positive adolescent development. *Journal of Applied Developmental Psychology, 23*(4), 373-392.

Eskil, M., Ozgan, H., & Balkar, B. (2010). Students' opinions on using classroom technology in science and technology lessons – A case study for Turkey (Kilis City). *TOJET: The Turkish Online Journal of Educational Technology*, *9*(1), 165-175.

Hamlen, K. R. (2011). Children's choices and strategies in video games. *Computers in Human Behavior, 27*(1), 532-539.

Kim, S., & Chang, M. (2010). Does computer use promote the mathematical proficiency of ELL students? *Journal of Educational Computing Research*, 42(3), 285-305.

Kozma, R. B. (2003). Technology and classroom practices: An international study. *Journal of Research on Technology in Education, 36*(1), 1-14.

Kubiatko, M., & Vlckova, K. (2010). The Relationship between ICT use and science knowledge for Czech students: A secondary analysis of PISA 2006. *International Journal of Science and Mathematics Education, 8*(3), 523-543.

Lauman, D. J. (2000). Student home computer use: A review of the literature. *Journal of Research on Computing in Education, 33*(2), 196-203.

Lee, S. M., Brescia, W., & Kissinger, D. (2009). Computer use and academic development in secondary schools. *Computers in the Schools, 26*(3), 224-235.

Li, X., & Atkins, M. S. (2004). Early childhood computer experience and cognitive and motor development. *Pediatrics, 113*(6), 1715-1722.

National Center for Educational Statistics [NCES] (2001). *The nation's report card: Science 2000*. Washington, DC: National Center for Educational Statistics.

Notten, N., & Kraaykamp, G. (2009). Home media and science performance: A cross-national study. *Educational Research & Evaluation, 15*(4), 367-384.

Ortiz, R. W., Green, T., & Lim, H. (2011). Families and home computer use: Exploring parent perceptions of the importance of current technology. *Urban Education, 46(2),* 202-215.

Ozgun-Koca, A. & Sen, A. İ. (2002). Evaluation of the Results of the Third International Mathematics and Science Study for Turkey. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, *43*, 145-154.

Papanastasiou, E. C., Zembylas, M., & Vrasidas, C. (2003). Can computer use hurt science achievement? The USA results from PISA. *Journal of Science Education & Technology, 12*(3), 325-332.

Raudenbush, S. W. ,& Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods*. Thousand Oaks, CA: Sage Publications.

Roberts, D. F., Foehr, U. G., Rideout, V. J., & Brodie, M. (1999). *Kids and media at the new millennium: A comprehensive national analysis of children's media use.* A Kaiser Family Foundation Report, Menlo Park, CA.

Sahin, I. (2010). Curriculum Assessment: Constructivist Primary Mathematics Curriculum in Turkey. *International Journal of Science and Mathematics Education, 8*(1), 51-72.

Samejima, F. (1969). Estimation of ability using a response pattern of graded scores. *Psychometrika Monograph, No. 17.*

Stock, E., & Fisman, R. (2010). The not-so-simple debate on home computers and achievement. *Education Week, 30*(7), 24-26.

Subrahmanyam, K. (2001). The impact of computer use on children's and adolescents' development. *Journal of Applied Developmental Psychology, 22*(1), 7-30.

Turow, J. (1999, May 4). *The Internet and the family*: The view from the parents, the view from the press (ReportNo. 27). Philadelphia, PA: Annenberg Public Policy Center of the University of Pennsylvania. Available at:http://www.appcpenn.org/internet/. (Retrieved from the Word Wide Web, April 15, 2011).

Ziya, E., Dogan, N., & Kelecioglu, H. (2010). What is the predict level of which computer using skills measured in PISA for achievement in mathematics. *TOJET: The Turkish Online Journal of Educational Technology*, *9*(4), 185-191.

UNIVERSITY TEACHERS' VIEWS ON THE USE OF INFORMATION COMMUNICATION TECHNOLOGIES IN TEACHING AND RESEARCH

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ABSTRACT
Because of the potentialities and influences of information communication technologies (ICTs) in facilitating research and instruction in higher education, students' learning products and processes can no longer be restricted to ink on paper. The problem, however, is that ICT use for instructional purposes by staff members at institutions of higher education can be affected by socio-cultural perceptions in different contexts. This study used a convergent parallel mixed method design consisting of a survey followed by interviews to describe the views of a group of Iranian university teachers on the application of ICTs in teaching-learning processes as well as their reported uses of ICTs. 115 randomly selected full-time faculty members in social sciences, engineering, science, and the arts at three major universities in central Iran participated in the survey. Their familiarity with ICTs, their views about the instructional benefits of ICTs in higher education, and their reported uses of ICTs were studied using a researcher-made 20-item Likert-scale questionnaire. A purposive subsample of 15 was also interviewed to offer data on obstacles blocking their ICT use. The analyses of data showed that Iranian university teachers strongly agreed with the educational benefits of ICTs in higher education. In spite of this, they reported infrequent uses of ICTs for research and instruction. Limited resources and facilities, insufficient skills, lack of time for initial preparations, and policy-makers' little support and encouragement were reported as the most serious problems facing university teachers in the use of ICTs. Based on the results and the possible social, cultural, and economic limitations, the article highlights the necessity of promoting staff members' and policy-makers' knowledge of the educational potentials of ICTs as a major priority in in-service trainings.
Keywords: Information Communication Technology, Higher Education, Iranian Universities, Views about ICT, Staff Research

INTRODUCTION AND BACKGROUND

One of the most influential recent changes in higher education is the application of information communication technologies (ICTs). These rapid changes have not affected all societies equally. In other words, the history of the use of modern ICTs in higher education is quite short but spreading at different rates in different contexts. Used in a wide sense in this study, ICTs refer to all manifestations of communication technologies such as computers, videos, and the associated hardware, networks, and software that have the potentials to be employed for educational and research purposes. They allow teachers and learners worldwide to work with them in teaching, learning, and research. The use of these technologies in higher education systems can be strongly affected by social contexts, appreciations of usefulness, and a combination of factors that may promote or limit their use.

The use of ICTs in Iranian higher education is currently associated with some uncertainties. The country seems to be approaching ICTs with a combined feeling of hope and despair. The history of the use of ICTs in this context is even shorter than the general history of the use of modern technologies in education throughout the world. Moreover, limitations in access to ICTs, lack of support or even opposition in some levels of policy-making or at specific time intervals (e.g. periods of political or social dissatisfaction), less openness to the global community, and inadequate training are among the factors that that can hinder the effective use of ICTs in Iranian institutions of higher education. Linking religious and cultural explanations to the present conditions, Godazgar (2009) reasoned that, because of the rule of Islamism and traditionalism since the 1979 revolution, the country has attempted to mix the modernity of institution of higher education with Islamic tradition and Iranian culture and that university education has continued with a stronger flavor of Islamic tradition to it. According to Godazgar ambiguous long-term aims of "making universities Islamic" and "the Unity of Seminary and University" ("Conclusion", para 1), have affected and complexified the post-revolutionary technological life of Iranian universities. Concerns about cultural invasion through ICTs, possible misuses of ICTs, or potential threats to national and ideological unity may also contribute to hesitations about promoting the uses of ICTs in higher education as evidenced by some limitations and controls. These concerns originate from serious attempts in the higher levels of the centralized education hierarchy to de-Westernize and Islamicize the country and its educational system (see Kheiltash, and Rust, 2009). This may also partially explain why around one-seventh of the credit units required for any first degree at any university in Iran should currently be related to Islamic topics in the country.

In spite of the existence of uncertain feelings of hopelessness and helplessness about the uses and influences of ICTs in the context of Iran, institutions of higher education have tried to pave the ground for the use of ICTs in their current learning and teaching activities. These institutions include public universities, private universities called Azad University branches, NGOs, and Distant learning centers called Payame-Noor University branches. Observation reveals that every individual university and most of its affiliated centers even in smaller cities remote from the capital have websites and are now usually equipped with an IT/ICT center where IT assistance is offered. Institutional email addresses are also provided for all students and teachers at almost all public universities. Most dormitories attached to public universities are also equipped with small computer and Internet centers where students can take turns to use computers and connect to their low-speed Internet. Almost all staff rooms in public universities and most staff offices in Azad and Payame-Noor universities, usually shared by two or three staff members, are equipped with a PC connected to the Internet. Even in some cities of the country, student registration and student record tracking is now done through the Internet and Intranets, with some students having to go to nearby internet cafes for services.

The promotion of skills in the use of ICTs has been emphasized in recent years in families as well as in higher education centers. For the young generation of all families, learning the use of modern ICTs is one of the priorities and most youngsters will need to attend private training centers. In higher education, many institutions offer workshops and training sessions to encourage their academic staff to use ICTs and internet-based activities for educational purposes. In other words, Macek's (2004) cyber-culture proposed to co-exist with the traditional culture is beginning to shape in the tertiary level of education in Iran under the influences discussed above.

Ordinary people, experts, policy-makers, and practitioners take different positions about the usefulness of ICTs in general and in educational contexts in particular. Some scholars (e.g. Kozma, 1994) have raised doubts about the effectiveness of ICTs in education. Others have claimed that the effectiveness of ICTs depends on those who use them. Teachers are the keys to the successful implementation of ICTs in higher education. "What we do know, whether from personal experience as teacher or learner, or as the result of 20 years of research into the question, is that ICT has an impact on learning, for some learners, under some conditions, and that it cannot replace a teacher" (McFarlane, 2002, para 2). McFarlane has placed great emphasis on the key role of the teacher in integrating ICTs with the curriculum and culture of the student believing that the use of ICTs in higher education is dependent on cultural contexts.

Even though some researchers like Kozma (1994) have expressed doubts regarding the effectiveness of ICTs, most scholars agree that they can be used effectively as instructional media. Bruce and Levin (2001) suggested that technology could be helpful in classroom settings by encouraging inquiry, helping communication, constructing teaching products, and assisting students' self-expression. ICTs can also help teachers in building socially constructed student-centered learning. Moreover, Bransford, Brown, and Cocking (2000) argued that technology could play the important roles of bringing real-world experiences into the classroom, providing scaffolding for cognitively complex learning tasks, increasing individualized feedback and group interaction, and expanding opportunities for teacher development. ICTs can be used to combine various elements of text, image, sound, and/or animation in an integrated and dynamic format. For instance, the availability of chat, email, blog, and other similar technologies on the World Wide Web "has the potential to extend instruction beyond traditional class time and to enhance student learning in blended courses" (Mackey & Ho, 2008, pp. 387). ICTs have shown to benefit from characteristics necessary for optimal learning environments including cost-effectiveness, interactivity, up-to-datedness, face-validity, rapidity, modifiability, ease of data navigation, and creativity as well.

Because of the positive dimensions that ICTs can add to research and instruction in higher education, demands for them increase daily among university students and teachers. In a recent survey, Kim and Bonk (2006) emphasized that more blended learning strategies using information and communications technologies were on the rise and that universities had to be responsive to these consumer demands. Numerous ICT-related educational tools and activities are created daily, waiting to be put to educational uses. These can be promoted and put at the service of higher education, provided that policy makers, teachers, and students show and develop the necessary understanding, willingness and preparation to use them. Nowadays, most students in developed countries come to university with expectations that in universities ICTs will be accessible, available, and effectively used (Sachs, 2006). In Iran, some students may be less aware of current developments in ICTs or may be digitally less literate to have the same level of expectations observed by Sachs.

The potential benefits of ICTs in higher education cannot be limited to teaching and learning. They can be very valuable resources for research conducted by teachers and students in institutions of higher education. Tools such as emails, wikis, and blogs, databases, analysis software, and many other forms of ICTs can be employed in all stages of the research process from choosing the research topic to collection of data, to data analysis, to summarizing findings, and to drawing practical implications from the discussion of results. ICTs can, therefore, help university teachers in both instruction and research.

Many variables can limit university teachers in their use if ICTs for research and instruction. Socio-cultural limitations in the context of the use of ICTs, different perceptions of their (dis)advantages, and obstacles encountered in their application in higher education are among the factors that can negatively affect their understanding and use. Previous research has shown that many obstacles can prevent teachers from using ICTs such as problems in infrastructures (Mehlinger & Powers, 2002; Pelgrum, 2001), lack of training (Jacobson & Weller, 1988; Schrum, 1999; Willis, Thompson & Sadera, 1999), weak technical support (Schrum, 1995), and logistical factors such as the lack of time, software, hardware, keyboarding skills, knowledge of available information technology resources, and unavailability of computer labs and computer lab technicians (Parker, 1997). Individual perceptions in finding ICT frustrating, believing that changes are too fast, and not having a positive view of the effectiveness of ICT can be other negative factors in the use of ICT.

Research on Iranian university teachers' views on the usefulness of ICTs in higher education and their actual use of ICTs is scare. Major studies carried out on the use of ICTs for university teaching and learning in this context have come up with different and sometimes contradictory results. Salajagheh (1998) studied the attitudes of computer users in the ICT center of Shiraz Medical University in Iran and found that all users there had a positive attitude about the use of ICTs in teaching and learning. He found no differences between subgroups of users with different genders, fields of study and teaching experience. However, in a study of factors affecting the use of ICTs for research and instruction among Iranian faculty members, Sarmadi, Ebrahimzadeh, Tafazoli Moghadam, and Dayani (2010) found significant effects on the amount of ICT use for perceived complexity of ICT, positive attitude toward the advantages of ICTs, perceived testability of teaching and learning through ICT, and proficiency in English as a foreign language. They reported no significant effects on the amount of ICT use for perceived adoptability of ICTs to the Iranian university teaching and learning context. In another study, Sotoodeh (1998) studied the use of computers and the Internet in both medical and non-medical universities in Shiraz and found that most users approached ICTs for accessing new thoughts and ideas and that their most frequent use of ICT facilities was the word processor and the email. Similarly, Tasviri Ghamsari (1999) investigated ICT use among faculty members of the Iranian Institute of Industrial and Scientific Research and found that email was the most frequently used form of ICT and that university degree and field of study were positively correlated with the amount of use. Significant positive effects on ICT use by Iranian university teachers have also been reported for field of study, age, university degree, and teaching experience. University teachers in the humanities and older teacher have been reported to use ICTs less than all others (Sharifi, 2003).

The studies reported here focus mainly on the type of ICTs preferred or used by Iranian university teachers and on the relevance of variables such as teaching experience, age, and field of study. In order to understand more about Iranian university teachers' role as good models of using information and communication technologies, a first necessary step is to explore their knowledge of and beliefs about the uses of ICT in higher education. It seems somehow odd to try to promote the use of ICTs in Iranian higher education without knowing about the perceptions of the more traditionalist faculty members and policy-makers as well as those of the young generation. As Snelbecker (1999) argued, it is *almost* (emphasis added) impossible not to be aware of the uses and influences of technology in instruction, education, or training issues. Inconsistent, limited, and somehow hesitantly growing level of ICT access usually provided in the country and in university settings in Iran that can, according to Schneiderman (2002), affect variability of ICT use. For Schneiderman, deeper human issues like ‘‘feelings of mastery, satisfaction with accomplishment, and a sense of responsibility’’ are important considerations in the use of technology by everyone" (p. 65). The human factor is one of the major dimensions to consider in relation to the use of ICTs in higher education and university teachers are the key human actors in this scene. Their views and perceptions can determine how they use ICTs and how they may be helped to employs their potentials more effectively for teaching and research. This study aimed to investigate Iranian university teachers’ familiarity with ICTs, to describe their reported use of ICTs, and to survey their views on the benefits of ICTs for higher education. Furthermore, the study aimed to discover the main obstacles in using ICTs for teaching and research from the perspective of university teachers. More specifically, the study sought answers to the following research questions:

1. How familiar are Iranian university teachers with ICTs as indicated by their responses to questionnaire items?
2. What are Iranian university teachers' views about the usefulness of ICTs in higher education?
3. How much do Iranian university teachers use ICTs as reported in the frequency of their responses to questionnaire items?

4. What are the most frequent obstacles for the use of ICTs in higher education as reflected in interviews with university teachers?

METHOD

A mixed method research design (Creswell, 2003) including the collection and quantitative analysis of questionnaire data followed by qualitative analysis of focus group interview data was used to address the research questions. In this type of convergent parallel mixed method design (Creswell & Plano Clark, 2011) qualitative focus group interview data were collected to further understand the quantitatively reported and analyzed use of ICTs in higher education. The survey questionnaire was designed and administered to collect quantitative data on university teachers' familiarity with ICTs, their views on the usefulness of ICTs in Iranian higher education, and their reported uses of ICTs. Such surveys are most often used in the early stages of investigating ICT use to better understand potential users (Rubin, 1994). Focus group interviews with a purposive sub-sample of the participants, who reported the lowest level of ICT use in the quantitative analyses of questionnaire data, helped the researcher classify the most common obstacles to the use of ICTs in educational contexts. Focus group interviews in educational research use purposive sub-samples to provide specific data on peoples' views and attitudes (Cheng, 2007). With its focus on a selected sub-sample, this technique offered data on university teachers' views about the problems that they encountered in their application of ICTs for research and instruction. Interview data was used to further clarify the quantitative data provided by the whole sample.

The teachers: The research population of the study included about 500 faculty members teaching social sciences, humanities, engineering, science, or arts at different universities in Kashan, central Iran. A randomly-selected sample of 193 teachers was selected from this population to participate in the study. Only 115 teachers completed the questionnaires that were personally handed to them, forwarded to them through email, or sent to their offices through institutional post. The sample (n=115, male=107, female=8) was carefully chosen to reflect the male-female combination ratio in the research population. A disproportionate combination of male and female teachers is presently a feature of most Iranian institutions of higher education. When a respondent failed to return the completed questionnaire, an alternative method was tried or a replacement was made randomly from the research population to allow for the collection of data from an appropriate male-female ratio and a considerable sample size. The participants, all full-time tenure teachers, had different experiences of teaching courses in their disciplines which offered opportunities for the use of ICTs. A sub-sample of 15 teachers with the lowest reported use of ICTs also agreed to take part in focus group interviews. They were interviewed during three 25-minute sessions in groups of five. Since their level of proficiency in English was very low, both questionnaire and interview data were collected through the medium of their first language.

The questionnaire and the interviews: To measure university teachers' views on the use of ICTs in their teaching and research, a Likert scale questionnaire consisting of 50 items was initially developed based on a review of the related literature on the use of ICTs in education, pilot interviews with colleagues, and an earlier study of blogging in higher education (Zare-ee, Shekarey, and Fathi Vajargah, 2009). For validity considerations, the items of the questionnaire were written in the respondents' mother tongue, Persian, to make sure that they were fully comprehensible for all the participants. The questionnaire was also pilot tested with a convenience sample of 25 university teachers at two universities in the research setting. Based on the results of the analyses of pilot data and feedback from respondents and colleagues, irrelevant and ambiguous items were deleted and the remaining items were revised and used to prepare the final form of the questionnaire. This final version of the questionnaire (see Appendix) consisted of 20 Likert-scale items with 1 representing "strongly disagree" or "never" and 5 representing "strongly agree" or "always" for positive items. Weightings for the negative items (9 and 10) were reversed in the computations. The questionnaire included seven items on the respondents' familiarity with ICTs (items 5, 6, 7, 11, 13, 15, 19), eight items on their views about the usefulness of ICTs as instructional tools in higher education (items 1, 2, 3, 4, 8, 9, 10, 12), and five items on their use of ICTs (items 14, 16, 17, 18, 20). The Cronbach alpha reliability for the 20-item questionnaire was significant at the specified level of 0.05 ($R=0.76$, $p \leq 001$, $N=115$). Back-translation by an expert colleague from the English department was used to validate the wording and translation of questionnaire items. For the qualitative part of data collection, the leading interview question for the focus group interviews was the following: What do you think are the main obstacles that hinder university teachers' use of ICTs for teaching and learning? Selected teachers were interviewed in three groups of five. At the begging of the three 25-minute semi-structured interview sessions, this leading question was raised and probes were used to focus the interviews on it when necessary. Interview responses to this question were recorded, semi-transcribed for significant statements, and coded for categories of obstacles to ICT use and emerging themes.

ANALYSES AND RESULTS

Questionnaire data were summarized and analyzed using the Statistical Package for Social Sciences (PASW). Frequencies of responses and descriptive statistics for individual questionnaire items clarified what university teachers taught about the use of ICTs in higher education. For further information and reference, the descriptive statistics for all questionnaire items have been incorporated into the list of items in the Appendix. Response frequency and descriptive analyses showed that items related to university teachers' views on the benefits of ICTs in higher education (e.g. items 1, 2, and 8) received the highest means as shown in Table 1. In fact, all of the 115 respondents strongly agreed that ICTs were more powerful than printed materials and other traditional tools of teaching and research. The respondents rated the educational value of ICTs very high with a total score of five and a standard deviation of zero for the first four items in *Table 1*. Moreover, from their viewpoints, ICTs are valuable tools for human societies in general and for higher education in particular as evidenced by the lowest means assigned to the two negative items in *Table 1* below.

Table 1*:* University teachers' views on the usefulness of ICTs in higher education (n=115)

Item	M	SD
In my view, ICTs are more powerful tools of teaching and research than more traditional tools.	5	0.00
I feel that ICTs do not necessarily provide face-to-face intimate interactions between teachers and learners.	5	0.00
In my view, ICTs are more powerful tools of teaching and research than more traditional tools.	5	.000
In my view, ICTs are more effective for teaching and learning in higher education than books and other printed materials.	5	0.00
I think ICTs do *NOT* have noteworthy values for human societies in general.	1.83	.381
I think ICTs do *NOT* offer educational/instructional values in higher education.	1.70	.580

While all the respondents strongly agreed that ICTs were useful and valuable tools for research and instruction in higher education, they unanimously reflected concerns for possible losses in intimate face-to-face teacher-students interactions in university settings. Familiarity with the functions and characteristics of ICTs addressed through items 5, 6, 7, 11, 13, 15, 19 of the questionnaire was very high among the teachers. Descriptive analyses of the data returned the highest means for these items summarized in *Table 2*. Teachers either agreed or strongly agreed with the statements related to familiarity with ICTs. They all reported having obtained or developed ICT-based materials for teaching and research (questionnaire item 15, mean=5, 'the highest possible mean', SD=0), but no data was obtained about the quality or quantity of such materials.

Table 2: University teachers' familiarity with ICTs (n=115)

Item content	M	SD
Possession of ICT-based materials	5.00	.000
Knowledge of interactions through ICTs	5.00	.000
Knowledge of accessibility	4.85	.356
Knowledge of manipulation potentials	4.83	.381
Knowledge of problems that teachers can avoid through ICTs use	4.78	.414
Knowledge of speed in spreading information	4.76	.431
General self-perception of Knowledge of ICTs.	3.39	.952

The reported educational use of ICTs by teachers was addressed in items 14, 16, 17, 18, and 20 that produced lower means than the other two groups of items measuring familiarity with ICTs and views on the educational usefulness of ICTs. The data suggested that teachers in the context of this study emphasized the educational usefulness of ICTs (*Table 1*) and reported good levels of familiarity with ICTs (*Table 2*). However, based on the responses to the related items, they less frequently reported the use of ICTs in their teaching and research in higher education. All the participants strongly agreed that their experience of using ICTs for research and instruction in English was limited with the mean of five and standard deviation of zero. They also rated their colleagues' uses of ICTs low with (mean=2.9, SD=1.6).

To gain a more holistic view of what university teachers thought about the usefulness of ICTs in higher education, how familiar they were with them, and how frequently they used ICTs in teaching and research, total means were calculated for each question by adding up the means of the related questionnaire items. As shown in these aggregate means in *Table 3*, the targeted university teachers familiarize themselves with ICTs, believe in their educational potentials, but seldom use them.

Table 3*:* Educational usefulness, familiarity, and reported use of ICTs (n=115)

Variables	Questionnaire items	M	SD
Views on the Educational usefulness of ICTs	1, 2, 3, 4, 8, 9, 10, 12	33.20	.850
familiarity with ICTs in higher education	5, 6, 7, 11, 13, 15, 19	33.16	1.631
Reported use of ICTs in higher education	14, 16, 17, 18, 20	20.92	1.612

The participants in this study cannot be considered frequent users of ICTs for educational purposes. Even though no participants selected never (or disagree) on the five questionnaire items related to their use of ICTs for teaching and research, the reported use of ICTs produced the lowest total mean (20.92) compared with the total means for views on the educational use of ICTs and Familiarity with ICTs. 57 teachers (49.6%) said they rarely used ICTs and 58 (50.4%) reported that they sometimes used ICTs in their mother tongue, Persian.

Interview results on obstacles that can hinder teachers' use of ICTs in university teaching and learning were obtained during three semi-structured group interview meetings. The oral responses to the leading question of what teachers saw as the main obstacles that hindered university teachers' use of ICTs for teaching and learning were recorded. They were semi-transcribed for significant statements referring to an obstacle or a problem and were coded and verified with the help of a colleague. The codes fell into six categories or themes: facilities, skills, feedbacks, managerial support, time, and other obstacles. *Table 4* summarizes these results. *Limited resources* and facilities were reported as the greatest problems facing university teachers (27.7% of all the reasons provided). This was followed by *insufficient skills* (22.1%), the felt *need for on-the-job training* in the use of ICTs (22.1%), and *lack of time* for initial preparations by the teachers (20.1%).

Table 4: Most common problem categories in using ICTs in university teaching and learning

Obstacle in Using ICTs	count	%
Lack of facilities for the use of ICTs	89	27.7
Insufficient skills in using ICTs	71	22.1
Lack of time for initial preparations	65	20.3
Equal treatment of those who do and those who do not use ICTs	42	13.1
Lack of support from managers	37	11.5
Reasons no falling in the above categories	17	5.3
Total number of codes in the data	321	100

One of the teachers interviewed said that he had to arrange at least about a week ahead if he wanted facilities in his university for using the PC Lab or showing PowerPoint slides in his lectures and that many teachers, in his view, were discouraged from using group internet-based activities because of various problems. All the the other participants in his group agreed with his stance. Some of the obstacles in his view are provided in the following excerpt from the transcript of his responses.

> *Sometimes the big problem is some students' lack of mastery and cooperation. Before you can help them get going, class time is over…. Thinking of problems that I have experienced because of low internet speed, device failures, difficulties in making arrangements, and seeking permissions tempt me to prefer traditional lecturing….*

Along with lack of support from some managers and policy-makers, the unwillingness of some senior more experienced teachers in adopting ICTs was also mentioned as an obstacle for promoting the academic use of ICTs. Unlike the interviewee quoted above, another interviewee pointed out that the younger generation was now usually ahead of some senior teachers in ICT use and that not all teachers felt good in being helped by student assistants in ICT use.

DISCUSSION

The study suggests a mismatch between teachers' familiarity with ICTs and their beliefs in the value of ICTs in Iranian higher education on the one hand and current practices and limitations on the other. The significance of the findings of this study is that they indicate how consumer expectations in the use of ICTs may be adversely affected by the social context. In Iranian higher education, ICTs seem to be used less vigorously than they are believed they should be because of their numerous educational potentials. Most obstacles qualitatively revealed in the interview phase of the study (such as lack of support, lack of encouragement, unfair assessment, and insufficient facilities) are beyond the control of university teachers. The removal of these obstacles calls for the active participation of policy makers. This also suggest that while many educational policy-makers and leaders in this highly centralized higher education system may favor traditionalism as discussed earlier quoting Kheiltash, and Rust (2009), the practitioners show the understanding and the eagerness to use ICTs more frequently and more effectively.

University faculty members targeted in this study appreciate the potential benefits of ICTs for higher education and regard ICTs more powerful than traditional methods. This does not lend support to the claims made against the educational usefulness of ICTs. In the quantitative questionnaire survey part of the study, items related to the educational usefulness of ICTs received the highest means. Similar findings have been reported both internationally (e.g. Andrewartha, and Wilmot, 2001) and locally (e.g. Salajagheh's (1998). A positive attitude about the use of ICTs in teaching and learning among Shiraz Medical University staff was reported by Salajagheh (1998).

In the context of the possibility that vague general goals of Islamicizing and de-Westernizing Iranian universities might adversely affect their ICT use, Godazgar (2009) observed that Tabriz University teachers had the same positive attitudes but limited use. The findings of this study also call for measures on the part of educational policy makers to employ this positive attitude. The reported use of ICTs was relatively low for the population studied in this study yielding support to similar findings by Sotoodeh (1998), Tasviri Ghamsari (1999), and Bagherian (2002), who addressed university teachers in two other major cities of the country, Tehran and Shiraz. These findings suggest that claims for the ease of the use of ICTs in terms of technological requirements (e.g. Johnson, 2004; Mackey & Ho, 2008) be cautiously approached in the light of socio-cultural considerations. According to Warschauer, Knobel, and Stone (2004), narrowing the gap in numbers of computers in different social groups, greater attention to technology use for academic purposes, increased peer mentoring among teachers and better support for students (and teachers) who lack home computers are some of the steps that can be taken to properly employ modern dynamic educational media. To this, one can add measure that can enhance socio-cultural readiness for the educational uses of ICTs.

CONCLUSION

The conclusion that can be drawn from this study is that the use of ICTs as weapons against ignorance may be limited not only because of individual human failures (e.g. lack of skills, insufficient trainers, etc.) but also because of socio-cultural influences (e.g. loss of managerial support due to felt potential ideological threats behind ICT use). Making sure that there are enough qualified teachers who can operate computers and use ICTs in their learning and teaching is a very important part of today's educational reform and development. Training for these purposes is so important and vital in education that some researchers claim if insufficient effort is put into training teachers to use technology and to use it imaginatively then it is probably better to dispense with technology altogether (see Davies, 2005). If ICTs are now powerful and if they are becoming even more and more powerful, they will not probably win the battle against ignorance in higher education when there is human failure and a lack of investment in training teachers who use ICTs in developing countries. Previous research in this area suggests that technology can reduce social stratification or enhance equal research and educational opportunities for men and women (Warschauer, et. al. 2004). All these may, of course, depend also on how willing human sources in positions of power are to implement changes for the better use of ICTs.

This study suffered from a few limitations that future research may plan to overcome. First, it addressed university teachers in central Iran. A survey at the national level could have given a clearer picture of ICT use in higher education. Second, because of its scope the study was limited to questionnaire and interview data. Policy documents, observations, formal statistics, and other sources of data can enrich future studies in this area. Finally, ICTs were considered in a relatively underspecified and general conceptualization. Future research can broaden the scope of the survey to include more specific instances of ICT use in higher education. Further research in this area can investigate what might result in different patterns in the use of modern technologies in different developing or undeveloped countries and in different subgroups of their populations. It can comparatively explore the use of ICTs in the higher education systems of other nations with distinct emphases on research and instruction across geographically and economically diverse contexts.

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REFERENCES

Andrewartha, G. and Wilmot, S. (2001). Can multimedia meet tertiary educational needs better than the conventional lecture? A case study. *Australian Journal of Educational Technology*, 17(1), 1-20. Retrived from http://www.ascilite.org.au/ajet/ajet.html

Begherian, F. (2002). Payamadhaye hasel az estefade az internet baraye amoozeshe ali. [The consequences of the use of internet in Iranian higher education]. *Quarterly Journal of Research and Planning in Higher Education*. 23(4), 27-42. Retrieved from http://journal.irphe.ir/article-A-10-1-231-1-fa.html

Bransford, J. D., Brown, A. L., and Cocking, R. R. (2000). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press.

Bruce, B. and Levin, J. (2001). Roles for new technologies in language arts: inquiry, communication, construction, and expression. In J. Flood, D. Lapp, J. R. Squire, and J. R. Jensen (Eds, 2nd Ed.), *The hand book for research on teaching the language arts* (pp. 649-657). Mahwah, NJ: Lawrence Erlbaum Associates.

Cheng, K. W. (2007). A study on applying focus group interview on education." *Reading Improvement*, 44(4), 194-198.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, LA: SAGE Publications.

Creswell, J. W. and Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks, LA: SAGE Publications.

Davies, G. (2007, March) *Computer Assisted Language Learning: Where are we now and where are we going*? Article presented at the conference on E-Learning and Japanese Language Education: Pedagogy and Practice, Oxford Brookes University. Retrieved from http://www.camsoftpartners.co.uk/docs/UCALL_Keynote.htm

Godazgar, H. (2009, December 2). Attitudes towards the Internet in an Iranian university. *Payvand News Iran. Retrieved from* http://www.payvand.com/news/09/feb/1133.html

Jacobson, M., and Weller, M. (1988). A profile of computer use among the University of Illinois humanities faculty. *Journal of Educational Technology Systems*, 16(2), 83–97.

Johnson, A. (2004). Creating a writing course utilizing class and student blogs. *The Internet TESL Journal*, 10(8). Retrieved from http://iteslj.org/Techniques/Johnson-Blogs/

Kheiltash, O. and V. Rust (2009). Inequalities in Iranian education: Representations of gender, socioeconomic status, ethnic diversity, and religious diversity in school textbooks and curricula. In Holsinger, D. B. and Jacob, W. J. (Eds.). *Inequality in education: Comparative and international perspectives* (pp. 392-416.). Hong Kong: Comparative Education Research Center.

Kim, K. and Bonk, C. (2006). The future of online teaching and learning in higher education: The survey says. *Educause Quarterly*, 29(4), 22-30. Retrieved from http://net.educause.edu/ir/library/pdf/EQM0644.pdf

Kozma, R. B. (1994).Will media influence learning? Reframing the debate. *Educational Technology Research and Development*, 42(2), 7–19.

Macek, J. (2004, May). *Defining* cyberculture*.* Paper presented at the Paper for Cyberspace 2004 Conference, Brno, Masaryk University. Retrieved from http://macek.czechian.net/defining_cyberculture.htm#_edn1

Mackey, T. P. and Ho, J. (2008). Exploring the relationships between web usability and students' perceived learning in web-based multimedia (WBMM) tutorials. *Computers and Education* 50, 386–409.

McFarlane, A. (2002 April 26). Asking the unanswerable questions? *Times Educational Supplement*. Retrieved from http://www.tes.co.uk/article.aspx?storycode=363217

Mehlinger, H. D., and Powers, S. M. (2002). *Technology & teacher education: A guide for educators and policymakers*. Boston: Houghton Mifflin company.

Parker, R. (1997). Increasing faculty use of technology in teaching and teacher education. *Journal of Technology and Teacher Education*, 5 (2/3), 105–115.

Pelgrum, W. J. (2001). Obstacles to the integration of ICT in education: results from a worldwide educational assessment. *Computers and Education*, 37 (2), 163–178.

Rubin, J. (1994). *Handbook of usability testing: How to plan, design, and conduct effective tests*. New York: John Wiley and Sons, Inc.

Sachs, J. (2006). *Technology as a tool or tyrant: Universities responding to the challenges of learning and teaching in an information rich environment*. Paper presented at the Global Summit 2006: Technology Connected Futures, Sydney.

Salajagheh, M. (1998). *Shiraz Medical university students' attitude toward ICT use* (Unpublished MA thesis). University of Shiraz, Shiraz, Iran.

Sarmadi, M. R. Ebrahimzadeh, I. Tafazoli moghadam, A. H. and Dayani, M. H. (2010). Higher education in Iran: The impact of ICT on open and distance education (the case of Iran). *Library and Information Science*, 12(4), 37-52. Retrieved from http://www.sid.ir/en/index.asp

Schneiderman, B. (2002). *Leonardo's laptop: Human needs and the new computing technologies*. Cambridge: The MIT Press.
Schrum, L. (1995). Educators and the internet: a case study of professional development. *Computers and Education*, 23 (3), 221–228.
Schrum, L. (1999). Technology professional development for teachers. *Educational Technology Research and Development,* 47(4), 83-90.
Sharifi (2003). *The use of ICT in universities* (Unpublished MA thesis). Allameh Tabatabaie University, Tehran, Iran.
Snelbecker, G. E. (1999). Some thoughts about theories, perfection and instruction. In C. Reigeluth Mahwah (Ed.), *Instructional-design theories and models*. New Jersey/London: Lawrence Erlbaum.
Sotoodeh (1998). *Assessing electronic data* (Unpublished MA thesis). Medical University of Shiraz, Shiraz, Iran.
Tasviri Ghamsari, M. (1999). *Internet use in universities* (Unpublished MA thesis). Shiraz University, Shiraz, Iran.
Warschauer, M., Knobel, M., and Stone, L. (2004). Technology and equity in Schooling: deconstructing the digital divide. *Educational Policy,* 18(4), 562-588.
Willis, J., Thompson, A., and Sadera, W. (1999). Research on technology and teacher education: Current status and future directions**.** *Educational Technology Research and Development*, 47 (4), 29-45.

Appendix: Questionnaire items on the use of ICTs in higher education [a]

No	Items	M	SD
1	In my view, ICTs are more powerful tools of teaching and research than more traditional tools.	5.00	.000
2	ICTs (referring generally to computers, videos, hardware, software, and networks) increase my knowledge and skills as a university teacher.	5.00	000
3	In higher education, ICTs are more powerful tools than discussions and lectures without the use of ICTs.	4.85	.356
4	ICTs can be used as advanced instructional tools in higher education.	4.84	.365
5	I know that ICTs do not necessarily provide face-to-face intimate interactions between teachers and learners.	5.00	.000
6	As far as I know, ICTs can be used to effectively manipulate instructional contents and materials.	4.83	.381
7	I know that ICTs can spread knowledge and information faster than traditional methods.	4.76	.431
8	In my view, ICTs are more effective for teaching and learning in higher education than books and other printed materials.	5.00	.000
9	I think ICTs do **NOT** have noteworthy values for human societies in general.	1.83	.381
10	I think ICTs do **NOT** offer educational/instructional values in higher education.	1.70	.580
11	I know that many forms of ICT tools and techniques for higher education are accessible for use in teaching and research.	4.85	.356
12	In my view ICTs can be used as curriculum materials in higher education.	4.98	.131
13	I can avoid problems in many areas such as in handwriting and in organizing ideas when I use ICTs.	4.78	.135
14	I use/have used ICTs for teaching and research in Persian myself.	4.70	.858
15	I have obtained and developed ICT-based material for use in my teaching and research.	5.00	.000
16	I know about ICT-related materials developed in other languages like English that I can use for my teaching and research.	3.93	.491
17	My friends who learn about and use ICTs use them for educational purposes.	4.19	.687
18	My colleagues use ICTs for educational purposes.	2.86	1.643
19	Generally speaking, I have enough and satisfactory information about ICTs.	3.39	.952
20	I have **limited** experiences in using ICTs in English.	5.00	.000

[a] Each item was followed by a 5-point Likert scale for respondents to mark their responses. Means and standard deviations are based on responses provided by 115 full-time university teachers in central Iran.

Note: Items were introduced using clear instructions, definitions of terms, and blanks for demographic data including highest qualification, experience in years, and institutional affiliation in Persian to avoid misinterpretations.

USING DISTANCE PHYSICAL EDUCATION IN ELITE CLASS SOCCER REFEREE TRAINING: A CASE STUDY

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ABSTRACT
The objective of this study is to present a model in the framework of Distance Education (DE), which suggests that a Distance Physical Education Program (DPEP) could be applied to those who are at various ages, in various geographical locations, and are working in various professions as part-time or full-time professionals. The use of DE in physical education with the support of education technologies and specialist systems provides significant opportunities. Through its flexible structure, DPEP partly or completely eliminates the restrictions encountered in traditional physical education programs, such as high costs, differences in age, geographical location and profession, and it provides solutions that are specific to an individual. The scope of this study comprises all of the referees who are employed in the Turkish Super League (34 top-class and high classification referees and 78 top-class and high classification assistant referees). The program was applied for two years (2 x 46 weeks in 2008-2009 and 2009-2010). In order to collect data, physical measurements were made at the beginning of the application, at the end of the first year and at the end of the second year of the application to assess referees' capabilities of endurance, speed, agility and recovery ability. The results were loaded into a database. Based on the test results, referees were submitted to individual and physical education programs via weekly e-mails. The outputs recorded by the referees during the application period with the support of specialist systems were submitted to the trainer every week. These were then entered into the training diary in the software on the computer, and were later subjected to assessment. At the end of the assessment process, referees were provided with feedback and the physical education continued without interruption. For the analysis and evaluation of the data, statistical techniques, such as descriptive statistics, one-way repeated measures and post hoc comparisons, were used. When the analysis results were evaluated, it was found that the endurance capabilities of referees and assistant referees significantly improved, which is a fact that can directly affect their professional proficiencies. The results of this study reveal that it is possible to conduct remote physical education in the scope of DE, by taking into account the individual differences and by including the support of suitable technology.
Keywords: Distance education, distance physical education, referees, education technologies, physical development.

INTRODUCTION

Depending on the constant increase in the physical level in football, the Continued Professional Development (CPD) of referees is getting more and more important for referees' careers. The CPD serves as a cornerstone in the education policies in many countries (Armour & Yelling 2004). It is said that in order to help improve the professional development of trainees, solutions that will remove the time strain in learning environments should be found instead of a trainer-based approach (Beijaard, Verloop, Wubbels & Feiman-Nemser, 2000).

The internet, in today's culture, is increasingly and commonly used by everyone regardless of the age (Kennedy, 2005; Looney, 2008). In line with this increased use, the Internet is being benefited from in many various professional areas. A study on the teachers of physical education emphasizes that the physical education process should keep its strategic structure and should still be informal (Armour &Yelling 2007). The changing needs of CPD would be constantly met and the restrictions between the trainer and trainees would be reduced or removed (Armour & Yelling 2004 a).

Thorburn (2006) provides an insight on professionalism that knowledge, autonomy and responsibility are key and interrelated characteristics for the development of distance education in physical education. The key factors of professionalism offer remarkable advantages regarding the use of the internet in distance physical education. One of the studies on the subject explains that a constantly updated professional structure which includes the demands of sporting is desired in the programs of the continued physical development rather than a traditional curriculum program (Amour & Yelling 2004 b). Another study by Thorburn (2006) makes a rationale of this research study as a theoretical framework by stressing the role of professionalism in distance physical education.

Today, the physical proficiency of soccer players, with professional and face-to-face training under the observation of a trainer within a soccer club environment, has reached a high level and has yielded a much faster tempo in games. Referees' ability to keep pace with this increased game tempo and to apply the rules is closely related to their physical proficiencies. One study reports that referees cover around 9-11 km during an elite soccer match, and assistant referees cover around 6-8 km. (Castagna, Abt & D'ottavio, 2007). Furthermore, they are required to make a decision at least 3 or 4 times every minute (D'Ottavio & Castagna, 2001). The data suggest top-class referees have to apply the rules and make decisions under a high level of physical and psychological pressure, which is why referees should maintain a constant and a high level of physical development. However, the professions of referees do not keep to a professional structure. They work in various geographical locations and in various professions. Therefore, a need exists for a new way to remove the obstacles encountered during the physical education of referees.

Recently, DE has been commonly used in education to offer various opportunities for training to almost anyone. Aksal A. (2010) and Gazi A. (2010) pointed out that distance education applications and pedagogy foster professional development and personal development in higher education practices for both learners and tutors. DE is a flexible application, however, it might cause a loss of motivation due to the lack of face-to-face contact (Aksal A., 2009; Dabaj, F. Altinay & Z. Altinay, 2003; Gazi A., 2009;). In spite of this partial defect, trainees will believe in DE if the appropriate equipment and the training environment are maintained (Ilter, Aksu & Yılmaz, 2005). DE also has a structure which, when supported by education technologies and specialist systems, can ease communication with the target group, allowing for productive use of resources in line with the predetermined purposes. Today, multimedia computer technology is taken advantage of in enhancing the interaction between trainer and trainees, provided that it submits feedback to trainees in DE (McIsaac & Blocher, 1998).

Any education application that is structured on environments where trainers and trainees are separated in terms of time and location is named Distance Education (Ulug & Kaya, 1997). DE eliminates differences across cities, countries, ages and levels of income as well as the differences amongst professions (Miller & King, 2003). It meets the needs of the trainees regardless of these restrictions (Verduin & Clark, 1994). It allows for opportunities to provide education services in any place, such as a house, office, business center or a classroom environment (Roberts, 1996). The developments in education technology particularly on the Internet have significantly facilitated unlimited and easy access to information and have also eased the applications of DE, because the Internet has provided a cheaper and a faster means of communication (Gurbuz, 2001; Aydin & Tirkes, 2010). The inclusion of new technologies in DE has widened the learning environment (Chang & Lee, 2010). With these advantages, DE is being used in many various fields along with various education technologies and specialist systems.

Despite these advantages, some studies suggest that distance physical education may have practical problems due to the need for observation and assessment in physical education (Yaman, 2009). Through the specialist systems used in education systems, it is possible to document, evaluate and interpret the physiologic reaction of a trainee during physical education. The essential power of a specialist system is the use of an algorithm along with the methods toward a particular result, and the knowledge it contains (Onder, 2003). Specialist systems are defined as computer software that function as the basis for information and inference and are created to perform difficult tasks undertaken by people who are specialized in a particular subject. The use of such a system will significantly reduce the high costs that result from employing specialized people. Specialists make assessments based upon the data in their own field and inferences from the results. Similarly, specialist systems also make inferences based on the database, created in the form of software, and they reach conclusions. In this way, these devices that store the physiologic outputs of individuals during physical education are specialist systems.

The quality of these programs is based on the conformity of the program content with expectations (Daffuaa, Turki & Hawsawi, 2003). The specialist systems create opportunities for sharing, between the trainer and the trainee, of the data that are considered as important parameters of physical education, such as the number of heartbeats, loading intensity zone, energy consumption and covered distance. Additionally, it enables personal evaluation, thus allowing trainers to assess results and guide physical educations. In this framework, through the advantageous and flexible structure of the distance DE, it is believed that Distance Physical Education Program (DPEP) could be transferred into the system.

The research on online teaching and learning confirms that course design based on a constructivist framework is critical to the success of online practices (Gold, 2001; Ausburn, 2004; Salter, Richards & Carey, 2004; Wiesenberg & Stacey, 2005; Gazi A., 2009). DPEP, too, is based on a theoretical structure like all new constructivist-based models.

In the planning stage, four features were considered in applying the DPEP:

- Defining the physical levels which referees should achieve
- Constant re-structure of the physical features based on the application results of the physical features
- Selection and usage of a suitable learning environment during the transfer of applications and fulfillment of the demands
- Supervising the efficacy of the tools used
- Putting the suitable measurement methods into application in order to evaluate the training situation of referees

The internal and external requirements of DPEP were determined by considering these features (Table 1)

Table 1: Internal and external requirements of distance physical education program

Internal requirements		External requirements
Needs analysis Evaluation criteria Physical needs Group needs Individual needs	Distance Physical Education Program	Number of provinces Number of referees Number of Physical Education Programs Duration of Physical Education Program Number of times data were examined

The current situation was determined in this theoretical framework. Meeting the individual demands by taking the trainee's demands into account in light of the results was determined as the fundamental target.

The objective of this study is to prove that Distance Physical Education could be implemented for the individuals of various ages, professions and locations, with the support of suitable education technologies.

The hypothesis of the study is that Distance Physical Education could be implemented for the individuals who are at various ages, in various locations and are working as part-time or full-time professionals in various professions by means of recording and evaluating the physiological reactions, which must be observed during physical education, by means of suitable education technologies and by constantly guiding the trainings based on the emerging demands.

IMPORTANCE OF THE STUDY

It has been suggested that it would be difficult to implement distance physical education, emphasizing the need for observation and assessment during the implementation of physical education (Yaman, 2009). However, it is not always possible to do physical trainings in group environments, due to the restrictions in learning environment in some locations and in some situations. Because referees work in various professions, they can reserve only their after work hours for trainings. Since they are in various separate locations, it becomes impossible for them to perform face-to-face group trainings, which also makes distance physical education a must.

Also, it should be noted that the employment of expert trainers in 31 provinces would create a considerably higher cost for the organization. Implementing the distance physical education would clearly provide a good option for solving the aforementioned problems. This study could serve as an exemplary application model in order to reveal that the physical hurdles in applying the distance physical education could be overcome through DE.

When the previously mentioned individual differences of referees are taken into account, it becomes clear that person-specific applications matter. The new trends in education have gone towards the application of education regardless of location, time and age (Sıgrı, 2010). It is suggested that an individual level assessment has to be made when each new change was implemented (Hall, 1995). In training sciences, physical education which is customized and is applied based on the personal features are considered to be one of the fundamental factors of success (Sharkey & Gaskill, 2006). In this regard, this study is remarkable in achieving the application of the principle of individualization by evaluating each individual separately.

Also, the study is considered to contribute to the literature as there is not a sufficient number of studies on distance physical education.

METHOD

Problem Statement

a. We have tried to answer the following questions in this study.
b. Can individuals who work in different professions, either part-time or full-time, undertake common physical training?
c. Can individuals in different geographical locations do similar physical training together?
d. Can the physiologic loads be remotely checked in physical applications?
e. Can special training programs be remotely checked for those who will do similar physiologic loading?
f. Does it provide any advantage compared to group training?
g. Would it be possible to store physical outputs and ensure sustainability of the program?

Procedures

The subject of this study is the application of physical education programs in the scope of DE that were prepared by a trainer based on the test data in the beginning. Our application is based on the constructivist training model recommended by the research of Isman et al. (2005). In that model, the first step is determined as an input, the second step as process, the third step as output and the fourth one as the feedback. In the framework of this model, the physical measurements were made in order to determine the physical needs and requests of referees in the first place, and then an assessment on individual needs was made. The first step in the process of assessing the needs was selecting suitable tools and determining the problem. Then, a training time schedule was prepared in line with the determined purposes. These were submitted to the referees via e-mails within the scope of the selected communication technologies. In the second step, a pre-evaluation was made toward the determined targets and within the framework of needs analysis related to the strong and weak aspects of the program. The trainings on individual endurance, which were submitted over the Internet within the scope of DE, were performed by the referees in line with the heartbeat breaks, which were stated in the training program with the support of specialist systems. The third step included the referees' applying the training program, recording these applications by means of specialist systems, and submitting outputs to the trainer via the Internet. The trainer created a database of the results. The outputs stored in the database were automatically processed by the software. The graphics, as well as the tables, were assessed and interpreted by the trainer. The incoming data were evaluated by the trainer in terms of various parameters, such as length of time for forcing in the submitted program and physiologic recovery ability during the rest. If these data were satisfactory, we continued with the program or some alterations were made on the programs. The fourth step included assessment of strong and weak aspects of the application results and feedbacks to referees every week. With this, the continuity of the program was maintained.

Participants

The study group consisted of a total of 112 referees (aged 28 - 43). These included 8 FIFA referees, 26 high classification referees, 8 FIFA assistant referees, and 70 assistant referees, who were located in 31 different cities and who worked in the Super Football League in the 2008-2009 and 2009-2010 league seasons. In our application where we included all high classification referees and assistant referees in Turkey, we studied on all participants and there was no sample selection. The subjects who faced errors during the application of the test and were not able to participate in any of the three test sessions were considered as missing cases and were not included in the statistical evaluation.

Instrument

Selection of technology in education is a process that includes the stages of planning, designing, producing, implementing and evaluating technological products in line with the purposes. For the selection of technology related to our application, we have made many multidimensional evaluations, and in particular, in terms of efficacy and economy. The technological structure of the program was completed by using specialist systems. As a result, we decided to use communication and specialist systems via e-mail in the Internet environment (Fig.1).

Figure 1. Specialist Systems used in Physical Education applications.

Opportunities and restrictions

The study was limited to high classification referees and assistant referees who worked in the Turkish Super League for 2008-2009 and 2009–2010 football seasons. The data of the physical education were collected by means of technology and the application continued. These programs were restricted to 1.5 hours per day on average, 4.5 hours per week and 138 trainings in a year (46 weeks), which totaled 276 trainings in 2 years. The total was 414 hours of physical training, which referees were free to carry out any time and anywhere they liked, on any three days a week. These programs were applied between June 20th and May 20th each year.

Another restriction to the study was that the search for previous studies in literature on distance physical education has yielded in few studies.

Data collection

In the scope of DPEP, at the early stages of the application, the referees and assistant referees were administered pre-tests as follows: for evaluating endurance, the Yo Yo Intermittent Recover Level 1 (YYIRL1) (Krustrup et al., 2003; Castagno, Impellizzeri, Chamari, Carlomagno & Rampinini, 2006); for evaluating speed features, 20-30 m Sprint Test (Psotta, Blaus, Cochrane & Martin, 2005); for evaluating agility and coordination, the T' test (Hoffman, Tenenbaum, Mareshi & Kraemer, 1996); and for measuring recovery abilities, the Repeated Sprint Ability Test (RSAT) (Gabbett, 2009). Then, the obtained results were loaded into the database. In light of the test results, a physical education program, which was developed based on the principle of individualization, was prepared by the trainer and was submitted by weekly e-mails to the individual to be educated. The physiological outputs of this training program during the application (number of heartbeats, loading intensity zone, energy consumption, covered distance) were transferred by means of radio frequency (attached on the chest of the user) into the clock that had the data collection and processing software. The data in the specialized system clocks, which were used as the source of physiologic output, were then transferred by the users into their own computers via infrared technology, and then the data were compressed into a single file and submitted to the trainer by weekly e-mails. The incoming data were placed under the records of the relevant person in the training diary calendar within the software operating on the trainer's computer (Fig. 2).

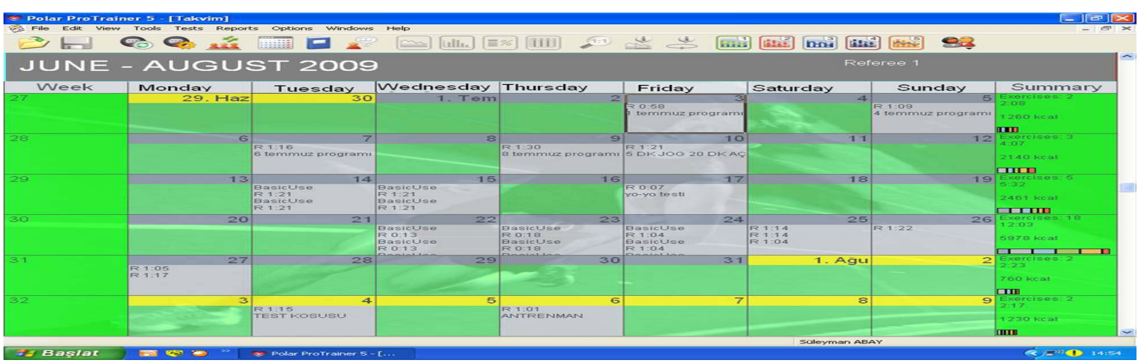

Figure 2. The Calendar of the Training Diary.

The analysis of the graphics and tables attached to the database were automatically processed. The program continued, and referees were provided feedback every week (Fig. 3). This stage covered a program of 2 x 46 weeks.

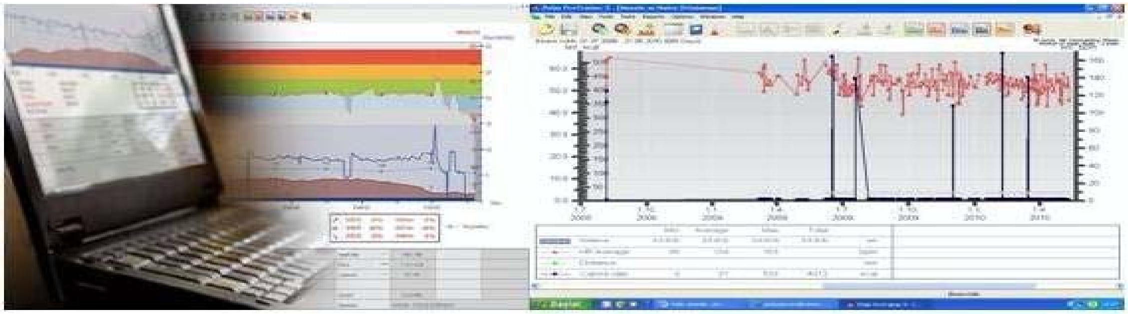

Figure 3. The graphics and tables of the outputs attached to the database, which are automatically processed.

At the end of the first and the second years of the education process, in order to evaluate DPEP results, all high classification referees and assistant referees were re-administered the same tests, and the results were loaded into the database of the relevant person.

The Analysis of the Data

Descriptive statistics (means, standard deviation and percentile) were utilized for dependent variables. A one-way analysis of variance with repeated measures was used for variables. For multi-comparisons, post hoc comparisons were performed with a Benferroni adjustment of the alpha level (0.05). The data acquired from the evaluation tools were analyzed using SPSS 14.00 for Windows statistics program.

RESULTS

At the beginning of DPEP, all referees and assistant referees were assessed in terms of their physical and physiologic capabilities, such as endurance, speed, recovery abilities and agility. The relevant findings are given below.

Results of Yearly Changes in Physical Features of High Classification Referees:

Table 2: Yearly Performance Results of High Classification Referees (Mean±SD).

		Start values	End of the first year	End of the second year		
	n	Mean±SD	Mean±SD	Mean±SD	F	p
20 m Sprt.(s)	27	3.20 ± 0.22	3.16±0.18	3.20 ± 0.15	0.67	0.54
30 m Sprt.(s)	27	4.59 ± 0.32	4.44±0.26	4.50 ± 0.21	4.05	0.23
30 m AA.(s)	28	1.43 ± 0.18	1.53±0.17	1.48 ± 0.13	4.95	0.01
T' Test (s)	26	10.61 ± 0.57	10.53±0.73	10.42 ± 0.76	0.71	0.49
RSMT (s)	32	7.52 ± 0.37	7.05±0.44	6.86 ± 0.45	36.4	0.00
RSBT (s)	32	7.28 ± 0.37	6.74±0.43	6.60 ± 0.41	44.5	0.00
YYIRL1 (m)	30	1248 ± 283.1	1437±281.2	1710 ± 329	48.4	0.00

AA= Acceleration, RSMT=Repeated Sprint Mean time, RSBT=Repeated Sprint Best Time, YYIRL1= Yo-Yo Intermittent Recover Level 1

The detailed results of application regarding high classification referees were provided in Table 2. In the course of time, the YYIRL1 distance mean values of referees increased in a statistically significant way (p<0.05). When compared to the beginning, progress was seen as follows: 19.4% (p<0.05) at the end of the first year and 41.4% (p<0.05) at the end of the second year (Fig. 4).

Although the capabilities of referees in 20 m and 30 m sprints are not statistically significant, they improved (when compared to the early stages) as follows: at the end of first year (-0.5% and -2.6% respectively) and at the end of the second year (-0.2%, and -1.9% respectively) (Fig. 5).

There is statistically significant difference in the feature of acceleration by years (p<0.05). Compared to the beginning, this significant difference seemed like an improvement in the first year (p<0.05) while it seemed a recession in the second year (p>0.05) (Fig. 5).

Although the agility and coordination capabilities of high classification referees are not statistically significant, they were slightly improved at the end of the first and second years.

According to the results of RSAT tests that were conducted to determine the best times and speed mean values, the mean time values for high classification referees has improved from (-6%) (p<0.05) at the end of first year to (-8.6%) (p<0.05) at the end of second year compared to the beginning. The best sprint speed of referees improved (-7.2%, and -9.1%) (p<0.05) at the end of first and second years, respectively, compared to the beginning (Fig. 6).

Results of Yearly Changes in Physical Features of High Classification Assistant Referees:

Table 3: Yearly Performance Results of High Classification Assistant Referees. (Mean ± SD)

		Start values	End of the first year	End of the second year		
	n	Mean±SD	Mean±SD	Mean±SD	F	p
20 m Sprt.(s)	53	3.22±0.15	3.26±0.14	3.27±0.12	2.3	0.10
30 m Sprt.(s)	53	4.58±0.23	4.55±0.18	4.59±0.19	0.75	0.47
30 m AA (s)	52	1.44±0.14	1.44±0.12	1.43±0.12	0.16	0.85
T' Test (s)	52	10.26±0.51	10.84±0.56	10.66±0.47	41.4	0.00
RSMT (s)	54	7.57±0.28	6.92±0.39	6.74±0.40	186	0.00
RSBT (s)	53	7.32±0.28	6.65±0.44	6.50±0.42	129.9	0.00
YYIRL1(m)	54	1210±291	1354±241.8	1532±367.3	34	0.00

AA= Acceleration, RSMT=Repeated Sprint Mean time, RSBT=Repeated Sprint Best Time, YYIRL1= Yo-Yo Intermittent Recover Level 1

The detailed results of application regarding high classification assistant referees were provided in Table 3. In the course of time, the YYIRL1 distance mean values of referees increased in a statistically significant way (p<0.05). When compared to the beginning, the progress was made as follows: 15% (p<0.05) at the end of the first year, and 28.8% (p<0.05) at the end of the second year (Fig. 4).

Although, when compared to the beginning, 20 m sprint values were not statistically significant at the end of the first and second years, there was some recession (1.5%, and 1.9 % respectively). As for 30 m sprint feature, while there was slight improvement at the end of first year (-0.1%), there was some recession at the end of second year (0.8%). As for the feature of acceleration, there was some recession at the end of the first and second years compared to the beginning (Fig. 5).

When compared to the beginning, the capabilities of agility recessed at the end of the first and the second years in a statistically significant way, respectively being (5.7%, 4.1%) (p<0.05) (Fig. 5).

According to the RSAT tests results, there was improvement (-8%) (p<0.05) at the end of the first year, and (-10.9%) (p<0.05) at the end of the second year. The best asymmetrical sprint speed of assistant referees improved at the end of the first and second years (-9%, and -11.2%) (p<0.05) respectively) compared to the beginning (Fig. 6).

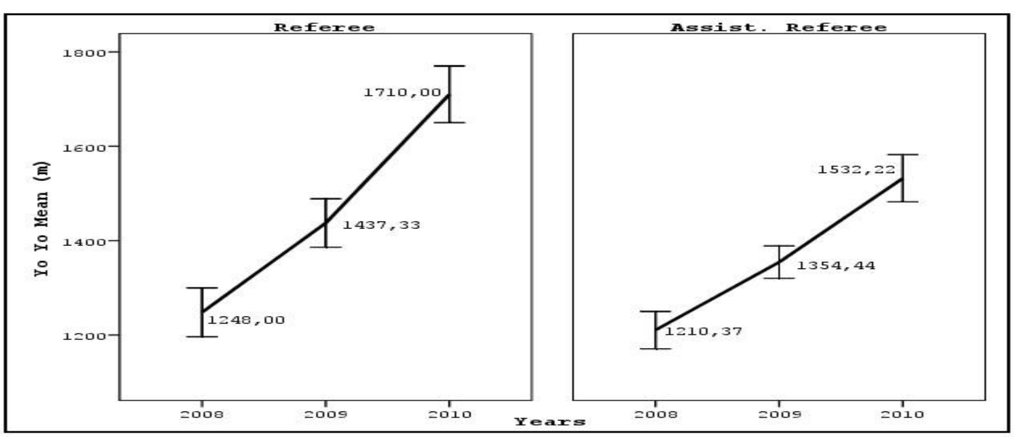

Figure 4. Diagram of changes in performance of endurance capability of high class referees and assistant referees.

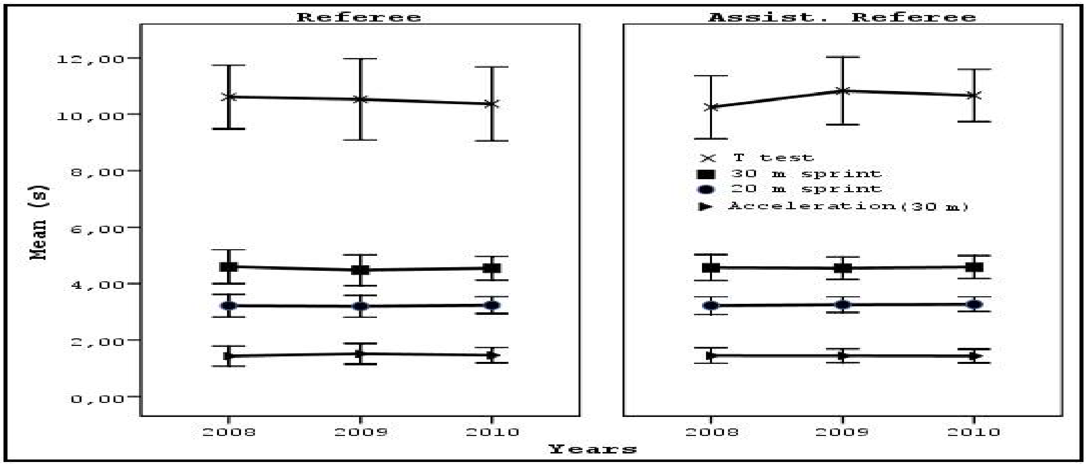

Figure 5. Diagram of changes in sprint and agility performances of high class referees and assistant referees.

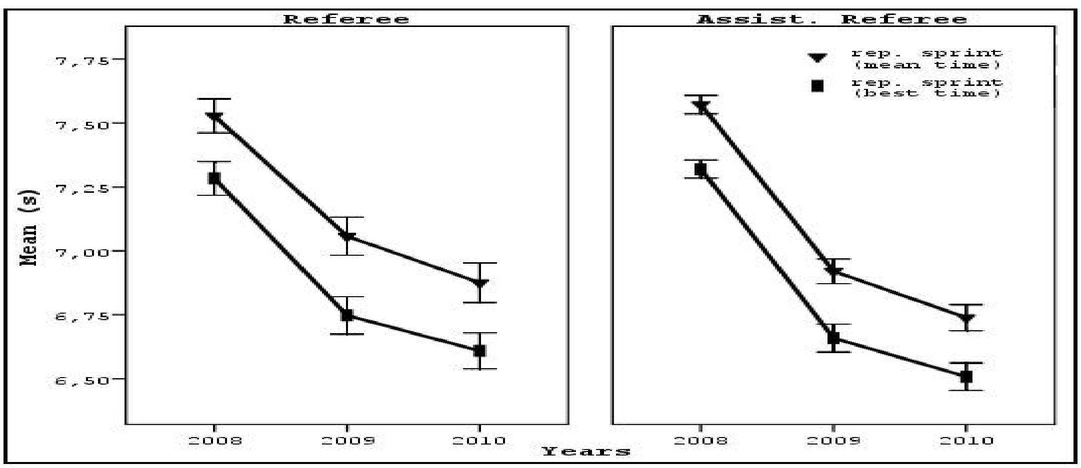

Figure 6. Diagram of changes in capability of recovery abilities of high class referees and assistant referees.

CONCLUSION AND DISCUSSION

Distance education is commonly used to obtain educational outputs at the end of the education process based on a theoretical basis. It is successfully used in Turkey and other countries with the student-centered approach (Gultekin, 2006). It has been discussed to some extent that DE, which is commonly used in the theoretical field, could also be used in physical education, too. Only a limited number of studies have been found through searches of the existing literature. In one of these studies, it is explained that distance education is hard to carry out (Yaman, 2009). Traditional face-to-face trainings in physical education do certainly have important advantages; however, sometimes, factors such as separate geographical locations, occupational restrictions and age differences do not allow for face-to-face physical education. Our hypothesis in this study is that distance physical education for those who are at various ages, in various geographical locations, in various professions, and working as part-time or full time professionals could be possible, in the scope of suitable education technologies, by means of evaluating, assessing the results and guiding the trainings after documenting the physiological reactions that need to be observed in the trainings.

The key achievement factor of the program has focused on the solution of the problems. The existing problem is that referees are working in various professions as part-time or full-time professionals. DE offers opportunity for trainees to do education in almost any place, such as the home, office, business center or classroom environment (Roberts, 1996). The opportunities offered by the flexible structure of DE were evaluated, and based on the individual feedback from tests, person-specific physical education programs were submitted to referees, and they were able to do it at any time and in any place they desired during the day.

The second target of the DPEP application is to find a solution to the issue of holding common and similar physical trainings for those who are in various geographical locations. In other words, it is not possible for referees who are working in 31 various cities to do trainings altogether. Furthermore, holding common physical education programs for referees throughout the country under the observation of a sufficient number of trainers through traditional physical training programs, costs too much for the organization. Using DPEP would significantly reduce this high cost arising from the employment of expert individuals (Gultekin, 2006). By means of the education technology in the framework of DPEP and through using specialist systems, the cost was considerably reduced.

Another key factor of the program is the capability to remotely control the physiologic load on the organism in the physical applications done in the framework of DPEP. This problem was solved by means of specialist systems. Thus, it became possible to evaluate when and what type of a need a referee would have, and new guiding became possible based on the physical development. Another advantage of the program is the ability to remotely manage the person-specific training programs, prepared specially by considering the age differences of individuals who will do similar physiologic forcing on the body. The weekly training program data about the physical features targeted for improvement here were recorded by referees by means of specialist systems and were submitted to the trainer. The analysis of these feedbacks was made, and DPEP were suitably re-guided, and, the referees had constant feedback.

Another feature of DPEP is that it increases the interest in the program. When a person-specific action is voluntarily made by that particular person, the application becomes more attractive (Houston, 2008; Leinonen & Bluemink, 2008). So, the programs, which were prepared in line with the physical demands of referees in their daily lives or during the competitions, would increase their interest and willingness. The fact that the program has a flexible and person-specific structure that also considers the age differences serves as an advantage over group trainings. The physical outputs documented and submitted by referees every week to the trainer after each physical education were stored by means of education technologies, and then a database was created. So, remotely saving, sorting, processing and transferring the application data into the application area, were constant.

One of the most important elements in education system is evaluation (Demirci, 2010). Two evaluation methods in particular (individual and group) are more common and predominantly used (Paris & Paris, 2001; Shepard, 2000). The individual method was used for this study. Using this method in the field of physical education has significantly contributed to the feasibility of the program. So, individual performances of referees were constantly checked for conformity to the program and the referees were guided when necessary.

In order to evaluate the aforementioned issues, the features to be developed in the beginning of DPEP were measured with suitable tests. Individual measurements were repeated at the end of the first and second years to assess the gains of the program. When the results were examined, significant improvements in features that directly affect the professional proficiencies of the referees and assistant referees were found. The YYIRL1 test performance that was applied at the beginning of the program to evaluate the endurance capability of referees of high classification was determined at 1216 m. This distance, when compared with the literature, was found to be too low. The previous studies reported this distance to be 1345 m for elite referees and 1720 for top-class referees (Krustrup & Bansbo, 2001; Weston, Helsen & MacMahon, 2004). In our application, it was measured that the referees had covered 1437 m at the end of the first year and that this distance had increased 19.46 % ($p<0.05$) compared to the beginning, while they had covered 1710 m at the end of the second year with an increase 41.49% ($p<0.05$) compared to the beginning. These results match those in the literature. Similarly, at the end of the second year, when compared with the start, somewhat significant progress had been made in the features of asymmetrical repeated average and best times (-8.6%, and -9.1% respectively) ($p<0.05$), such as wide angle during the observation of the game, repeated preparations for actions and changes in direction, which are considered important for referees. Statistically significant progress had been seen in the evaluation of agility and symmetrical speed ($p<0.05$). The fact that these improvements were seen in two years time, serves as an important proof that DPEP really worked successfully. When one considers the fact that a football game lasts for 90 minutes, the improvement that was gained in referees' features of continual, constant and repeated endurance is a key factor in terms of the professional proficiency of the referees.

Similarly, the assistant referees improved their YYIRL1 running distances. It was determined that the assistant referees had covered 1354 m at the end of the first year and that this distance had increased 15.09% ($p<0.05$) compared to the beginning, while they had covered 1532 m with an increase 28.8% ($p<0.05$) at the end of the second year, when compared to the start period.

There is a slight progress, though not statistically significant, in 20 m and 30 m sprint and acceleration values at the end of the first and second years, when compared to the start. However, this progress is important considering the fact that speed is a bio-motor feature that is hard to improve.

In the case of referees, mean time values of asymmetrical speed were measured as (-2%) ($p<0.05$) at the end of the first year, compared to the beginning, and (-10.9%) ($p<0.05$) at the end of the second year, according to the results of RSAT tests that evaluate another dimension of endurance. There is progress in the best asymmetrical sprint speed of assistant referees at the end of first and second years compared to the beginning (-9%, and -11.2% respectively) ($p<0.05$). Similarly, the capabilities of agility improved in a statistically significant way at the end of the first and the second years (respectively, 5.7%, 4.1%) ($p< 0.05$).

During the performance evaluation for both groups of referees, it was found that the features related to endurance improved remarkably; however, there was only a slight improvement, even with some recession, in the features of speed and agility. It is thought that this situation has to do with the specialist systems in DPEP.

Like any program, this application has strong and weak sides, too. Through the use of specialist systems, constant and remote monitoring, evaluation and feedback about heartbeats became possible, which resulted in significant improvement in the feature of endurance. However, the expected results of improvement in the feature of agility were not achieved due to the difficulty in controlling it through heartbeat values. However, it should be noted that the improvement of the features of speed and agility should normally take years. So, it could be recommended that the device for measuring the speed of running should be added into the education technologies to increase the efficiency of DPEP.

It is considered that DPEP, which is presented in the study as a new application, could be accepted as a model in this field. DPEP could partly or wholly eliminate the restrictions in the applications of traditional or group-based physical education. When applied within the scope of education technologies and based on the principle of person-specific customization, DE could be benefited from in many applications of physical education. The study is remarkable in that it demonstrates DFEP could be applied commonly in many sporting branches even when sportsmen are outside the club environment. It would also serve as a sample model during which sportsmen could continue with the program prepared in the framework of DE, especially outside competition periods.. Also, distance physical education could be applied to the sedentary individuals in the framework of DFEP. Thus, it would be possible to enlarge the coverage of DFEP and to make it more widespread.

As a conclusion, the results of the evaluation about the targets mentioned in the study indicate that the use of DE in physical education would produce positive results when used in the field of distance physical education supported by suitable education and measurement technologies. So, a wide range of individuals will be able to take advantage of the opportunity of physical education with much less cost and time.

REFERENCES

Aksal A., F. (2010). *Teaching online Course: Communication practices and roles of online tutors.* Germany: VDM Verlag.

Aksal A., F. (2009). Action plan on communication practices: Roles of Tutors at EMU distance education institute to overcome social barriers in constructing knowledge. *The Turkish Online Journal of Education*, 8 (2) 33-47.

Armour, K. M. and Yelling, M. (2007). Effective Professional Development for Physical Education Teachers: The Role of Informal, Collaborative learning. *Journal of Teaching in Physical Education,* 26 (2) 177 -200.

Armour, K. M. and Yelling, M. (2004 a). Continuing Professional Development for Experienced Physical Education Teachers: Towards Effective Provision. *Sport Education and Society*, 9 (1), 95 – 114.

Armour, K. M. and Yelling, M. (2004 b). Professional 'Development' and Professional 'Learning': Bridging the Gap for Experienced Physical Education Teachers. *European Physical Education*, Review 10, 71-93.

Ausburn, L. J. (2004). Designing Components Most Valued by Adult Learners in Blended Online Education Environments: An American Perspective. *Educational Media International*, 41 (4), 327-337.

Aydin, C. C., and Tirkes, G. (2010). Open Source Learning Management Systems in Distance Learning. *The Turkish Online Journal of Educational Technology*, 9 (2), 175 - 184.

Beijaard, D., Verloop, N., Wubbels, T. and Feiman-Nemser, S. (2000). The Professional Development of Teachers, R.J Simons et.al.(eds). Kluwer Academic Publishers, New Learning, 261-274.

Castagna, C. ,Impellizzeri, F.,M.. , Chamari, K., Carlomagno, D., and Rampinini, E. (2006). Aerobic Fitness and Yo-Yo Continuous and Intermittent Tests Performances in Soccer Players: A Correlation Study. *Journal of Strength and Conditioning Research*, 20, 320- 325.

Castagna, C., Abt, G. and D'ottavio, S. (2007). Physiological Aspect of Soccer Refereeing Performance and Training. *Sport Medicine*, 37 (7), 625 - 646.

Chang, C.Y., and Lee, G. (2010). A Major E-Learning Project to Renovate Learning Environment in Taiwan. *The Turkish Online Journal of Educational Technology,* 9 (1), 7 - 12.

Daffuaa, S.O., Al Turki, U.M., and Hawsawi, F.M. (2003). Quality Function Development for Designing a Basic Statistics Course. *International Journal of Quality & Reliability Management*, 20 (6), 740 -750.

Demirci, N. (2010). The Effect of Web-Based Homework on University Students' Physics Achievements. *The Turkish Online Journal of Educational Technology,* 9 (4), 156 - 161.

D'Ottavio, S. and Castagna, C. (2001). Analysis of Match Activities in Elite Soccer Referees during Actual Match Play. *Journal of Strength and Conditioning Research*, 15 (2), 167 - 171.

Gabbett, T.J. (2009). The Development of A Test of Repeated – Sprint Ability for Elite Women's Soccer Players. *Journal of Strength and Conditioning Research*, 24 (5), 1191 -1194.

Gazi A., Z. (2010). Preparing and Designing Online Course: Constructivist Approach, Team Work Culture. Germany: VDM Verlag.

Gazi A., Z. (2009). Implementing Constructivist Approach into Online Course Designs in Distance Education *The Turkish Online Journal of Educational Technology*, 8 (2).

Gold, S. (2001). A Constructivist Approach to Online Training for Online Teachers. *Journal of Asynchronous Learning Networks,* 15 (1), 35-57.

Gultekin, M. (2006). Using of Distance Education Approach in Teacher Training; Anadolu University Open Education Model. *The Turkish Online Journal of Educational Technology*, 5 (1), 101 - 116.

Gurbuz, T. (2001). Computer Literacy in Its Changing Sense, Education in the light of Information Technology, Conferences and Serial Papers Book, 3-5 May 2001 ,METU, Ankara 163-168.

Hall, G. E. (1995). 'The Local Educational Change Process and Policy Implementation'. Pages 101-125 in Carter, D.S.G, and O'Neill, M.H. (Eds.). *International Perspectives on Educational Reform and Policy Implementation.* London: The Falmer Press.

Hoffman, J. R., Tenenbaum, G. M., Mareshi, C., and Kraemer, W. J. (1996). Relationship Between Athletic Performance Tests and Playing Time in Elite College Basketball Players. *Journal of Strength and Conditioning Research*, 10 (2), 67 - 71.

Houston, D. (2008). Rethinking Quality and Improvement in Higher Education. *Quality Assurance in Education*, 16 (1), 61 - 79.

Ilter, B. G., Aksu, M. B., and Yilmaz, N. (2005). Students' Views of Distance Education Provision at One University. *The Turkish Online Journal of Educational Technology,* 6 (4), 128 - 137.

Isman, A., Dabaj, F., Altinay, F., and Altinay, Z. (2003). Communication Barriers in Distance Education. *The Turkish Online Journal of Educational Technology,* 2 (4), 10 - 14.

Isman, A., Caglar, M., Dabaj, F., and Ersozlu, H. (2005). A New Model for the World of Instructional Design. *The Turkish Online Journal of Educational Technology,* 4 (3), 33 - 39.

Kennedy, A. (2005). Models of Continuing Professional Development: A Framework for Analysis. *Professional Development in Education,* 31 (2), 235-250.

Krustrup, P., and Bangsbo, J. (2001). Physiological Demands of Top Class Soccer Refereeing in Relation to Physical Capacity: Effect of Intense Intermittent Exercise Training. *Journal of Sports Science*, 19, 881 - 891.

Krustrup, P., Mohr, M.., Amstrup, T., Rysgaard, T., Johansen, J., Steensberg, A.., Redersen, P..K.,and Bangsbo, J. (2003). The Yo-Yo Intermittent Recovery Test: Physiological Response, Reliability, and Validity. *Medicine & Science in Sports & Exercise,* 35, 697 - 705.

Leinonen, P., and Bluemink, J. (2008). The Distributed Team Members' Explanations of Knowledge They Assume to be Shared. *Journal of Workplace Learning*, 20 (1), 38 - 53.

Marillyn A. Looney (2008). Using an Online Survey Tool to Enhance Teaching. *Measurement in Physical Education and Exercise Science,* 12, 113-121.

McIsaac, M.S., and Blocher, J.M. (1998). How Research in Distance Education Affects Practice. *Educational Media International,* 35 (1), 43 - 47.

Miller, G. E., and King, F. B. (2003). Distance Education: Pedagogy and best practices in the New Millennium. *International Journal of Leadership in Education,* 6 (3), 283 - 297.

Onder, H. (2003). Computer Use and Expert Systems in Distance Education. *The Turkish Online Journal of Educational Technology,* 2 (3), 142 -146.

Paris, S. G., and Paris, A. H. (2001). Classroom applications of research on self-regulated Learning. *Educational Psychologist,* 36, 89 - 101.

Roberts, J.M. (1996). The Story of Distance Education: A Practitioner's Perspective. *Journal of the American Society for Information Science,* 47 (11), 811 - 816.

Psotta, R., Blaus, P., Cochrane, D.J., and Martin, A. J. (2005) The Assessment of an Intermittent High Intensity Running Test. *Journal of Sports Medicine and Physical Fitness*. 45 (3), 248 - 249

Salter, D., Richards, L., and Carey T. (2004). The 'T5' design model: An instructional model and learning environment to support the integration of online and campus based courses. *Educational Media International*, 41 (2), 207-217.

Sharkey, B.,J., Gaskill, S.,E.(2006). *Sport Physiology for Coaches*, Human Kinetics, United States, 31-36.

Shepard, L. A. (2000). The Role of Assessment in a Learning Culture. *Educational Researcher*, 29, 4 -14.

Sigri, U. (2010). The Paradigm Shift in Educational Management: An Evaluation of Distributed Learning as Future Approach. *The Turkish Online Journal of Educational Technology*, 9 (2), 205 - 211.

Thorburn, M.(2006). The Loneliness of the Long-distance Scottish Physical Education Teacher: How to Provide Effective in-service for Experienced Teachers' Implementing New Curricula. *Professional Development in Education,* 32 (3), 359-373

Ulug, F., and Kaya, Z. (1997). Distance Elementary Education. Ankara: Distance Education Foundation.

Verduin, J. R., and Clark, T. (1994). Distance Education: Guidelines for Effective Use. (Translated by Ilknur Mavis). Anadolu University Press.

Weston, M., Helsen, W., and MacMahon, C. (2004). The Impact of Specific High-Intensity Training Sessions on Football Referees' Fitness Levels. *American Journal Sports Medicine*, 32(1), 54 - 61.

Wiesenberg, F., and Stacey, E. (2005). Reflections on Teaching and Learning Online: Quality Program Design, Delivery and Support Issues from a Cross-global Perspective. *Distance Education*, 26 (3), 385-404.

Yaman, M. (2009). Perception of Students on the Application of Distance Education in Physical Education Lessons. *The Turkish Online Journal of Educational Technology*, 8 (1), 65-74.

WHY TURKISH PRE-SERVICE TEACHERS PREFER TO SEE POWERPOINT PRESENTATIONS IN THEIR CLASSES

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ABSTRACT
PowerPoint has become very popular presentation software used in educational settings. The literature indicates that the effectiveness of PowerPoint presentations is inconclusive and that students have positive attitudes toward PowerPoint presentations. However, the question why students prefer to see PowerPoint in their classes is still in discussion. Therefore, the purposes of the study are to investigate pre-service teachers' attitudes toward PowerPoint presentations, understand the reasons why they prefer to see PowerPoint presentations in their future classes, and present their suggestions about the ways to improve the quality and usefulness of PowerPoint presentations. "Presentation Software Survey: Student Perspective" (Frey & Birnbaum, 2002) was used in order to collect data for this study. The survey contains 12- item Likert type questions and two open-ended questions. The data were collected from 211 pre-service teachers studying at three different departments in one of the large Turkish Universities. The findings of the study indicated that the majority of the participants prefer to see PowerPoint presentations in their future classes for helping them study for the course exams and providing the long term retention of knowledge. More than half of the participants suggest that more visuals, pictures, and videos should be used in PowerPoint presentations.

INTRODUCTION

PowerPoint has become very popular presentation software used in business and educational contexts (Craig & Amernic, 2006; Szabo & Hastings, 2000). It is estimated that PowerPoint is used over 30 million presentations a day and its software is on 250 million computers on the world (Savoy, Proctor, & Salvendy, 2009). While PowerPoint lectures become more prominent in the higher education institutions (Brown, 2007; Craig & Amernic, 2006; DenBeste, 2003; Gier & Kreiner, 2009), there has been a debate about the advantages, benefits, and effectiveness of the software. Initially PowerPoint is designed to help structure both the content and the process of a lesson or lecture and prevent it from rambling (Hlynka & Mason, 1998; Savoy et al., 2009). Supporters of PowerPoint believe that PowerPoint helps to keep students' interest and attention to the lecture (Szabo & Hastings, 2000), improves students' learning (Lowry, 1999), and aids explanations of complex illustrations (Apperson, Laws, & Scepansky, 2006). On the other hand, Creed (1997) describes PowerPoint as a teacher-centered instructional tool that nourishes teacher-controlled lectures. Similarly, Tufte (2006) points out that PowerPoint reduces the analytical quality of a presentation, limits the amount of detail that can be presented, and often weakens the verbal and spatial thinking.

Moreover, the research studies indicated conflicting findings about the effectiveness of the PowerPoint in terms of improving student learning (Craig & Amernic, 2006; Levasseur & Sawyer, 2006). Gier and Kreiner (2009)'s study conducted on 73 undergraduate psychology students showed that when the students were actively engaged in the class and PowerPoint presentation was supported by content based questions, the information retention was increased. Szabo and Hasting (2000) conducted three studies to investigate the efficacy of PowerPoint lecturing and found a significant difference of students' grades between overhead lecture and PowerPoint lecturing in their only second study. They suggested that the efficacy of PowerPoint lecturing may be case specific rather than universal.

Other studies found no significant difference in students' academic achievement between the traditional lectures and PowerPoint supported lectures (Daniels, 1999; Savoy, Proctor, & Salvendy, 2009). Daniels studied with a group of students taking economy courses without desktop presentation programs (DPP) materials and a year later studied again with the same group of students taking another economy course with DPP materials. Daniels compared students' test scores and feedbacks and concluded that use of DPP neither improved nor hindered student performance. However, almost all of the students (98%) had positive attitude toward DPP materials and found DPP materials useful. Similarly, Savoy et al. conducted a study in the U.S. with 62 students enrolled in the human factors in engineering course in order to compare information retention between PowerPoint and traditional lectures. The findings of the study also showed that no significant difference was found between PP group and the traditional group in terms of most of the assessment variables. In fact, the traditional group scored higher than the PP group at audio assessment variable.

Apperson, Laws, & Scepansky (2006) examined the impact of the use of PowerPoint on students' experience in the classroom. The findings of the study indicated that although there were no differences in grades as a result of the use of PowerPoint, organization and clarity, entertainment and interest, professor likeability, and good professor behaviors were enhanced with PowerPoint.

Bartsch and Coben (2003) investigated the effects of three types of presentations including transparencies, basic PowerPoint (only text) and expanded PowerPoint (text with pictures and sounds) on student learning and attitudes. Students preferred PowerPoint presentations since they believe they learned more from PowerPoint presentations. However, their course grades revealed a different conclusion that students came from the expanded PowerPoint lectures did worse on the exams and had greater dislike for slides with pictures which were not relevant. Other researchers have demonstrated that material such as irrelevant sounds (Moreno & Mayer, 2000), interesting but extraneous text (Schraw, 1998), and irrelevant pictures (Mayer, 2001, p. 113) can reduce comprehension.

Although the research about the effectiveness of PowerPoint supported lectures is inconclusive, studies indicate that students have positive attitudes toward PowerPoint (Apperson, Laws, & Scepansky, 2008; Can, 2010; Craig & Amernic, 2006; Kahraman, Çevik, & Kodan, 2011; Levasseur & Sawyer, 2006; Susskind, 2005; Uz, Orhan, & Bilgiç, 2010). Apperson, Laws, and Scepansky (2008) investigated student preferences regarding the physical structure of PowerPoint. Students completed a 36- item 7-point Likert scale survey and four open-ended questions indicated that they preferred the use of key phrase outlines, pictures and graphs, slides to be built line by line, sounds from popular media, or that support the pictures of graphics on the slide, color backgrounds, and to have the lights dimmed.

Perry and Perry (1998) surveyed with 98 students from computer information system and teacher education departments in order to determine students' preferences among four different types of presentations including multimedia, overhead transparency, chalkboard, and straight lecture. They found that a majority of them preferred multimedia presentations for several reasons including being more eager to attend to class, finding the course more interesting and more enjoyable, and holding their attention more. They also believed that they learned better and easily understand the difficult concepts with multimedia presentations. Can (2010) studied pre-service teachers' attitudes towards the effects of use of teaching materials including overhead projector and projector on learning and found that students believe that use of overhead projector and projector brings some kind of change, prevents teaching from being monotonous, and helps making a lively, colorful teaching and learning environment.

In a recent study, Kahraman, Çevik, and Kodan (2011) investigated the students' attitudes toward the use of PowerPoint in terms of gender and departments. They collected data by using "attitude toward the use of PowerPoint" instrument from 653 students studying at different colleges in the same university. The findings of the study indicated that there was no significant difference of students' attitudes toward the use of PowerPoint in terms of gender, but there was a significant difference in terms of colleges. Students enrolled in the Faculty of Engineering had more negative attitudes towards the use of PowerPoint compared to other students at different faculties (education, economics and administrative science, and vocational higher education). Some students believed that PowerPoint presentation increase the retention of information in the mind by featuring visuals and increasing their motivation by arousing attention and interest whereas others believed that PowerPoint becomes less effective and more boring if they are used more frequently than necessary and especially the use of PowerPoint carelessly and sloppily prepared cause distraction. Students at school of engineering also expressed that they did not like the PowerPoint presentations filled predominantly with mathematical expressions.

In another study, Uz, Orhan and Bilgiç (2010) collected data via using a Likert type survey developed by the researchers in order to examine pre-service teachers' opinions of the PowerPoint presentations. Data were collected from 684 pre-service teachers studying at different departments of colleges of education from four universities in Turkey. Participants in this study expressed partially positive opinions of the designs of PowerPoint slides and the effects on their learning. Students studying at department of computer education and instructional technologies expressed less positive attitudes while students from the department of education religion and ethics had more positive opinions of the use of PowerPoint. According to the results of the study, students agreed that PowerPoint presentations make courses more interesting and easy to follow. In summary, the recent studies indicated that students found PowerPoint lectures extremely helpful to take notes for exams (Frey & Birnbaum, 2002), excellent method of presentation that aided their learning (Clark, 2008), and still preferred PowerPoint lectures even though it was not affected their grades in a positive way (Bartsch & Cobern, 2003).

While studies showed that student have positive attitudes toward PowerPoint even when their achievement is not positively affected, most of the studies merely focused on comparisons of students' attitudes in terms of gender and department (Apperson, Laws, & Scepansky, 2008; Can, 2010; Craig & Amernic, 2006; Kahraman, Çevik, & Kodan, 2011; Levasseur & Sawyer, 2006; Perry & Perry, 1998; Susskind, 2005; Uz, Orhan, & Bilgiç, 2010). On the other hand, the reasons why they prefer to see PowerPoint presentations in their classes and what they suggest how to improve the effect of PowerPoint are still in question. Therefore the purposes of the study are to investigate student's attitudes toward PowerPoint presentations, understand why they prefer to see or not to see PowerPoint presentations in their classes, and present their suggestions about how to improve the quality and usefulness of PowerPoint presentations. In order to investigate these issues, the following research questions were generated.

1) What are attitudes of the Turkish pre-service teachers toward PowerPoint presentations?
2) Why do they prefer to see -or not to see- PowerPoint in their classes? In other words, what are the reasons behind the attitudes of the Turkish pre-service teachers toward PowerPoint presentations?
3) What do Turkish pre-service teachers suggest to improve the quality and usefulness of PowerPoint presentations?

METHODOLOGY

In order to collect data for this study "Presentation Software Survey: Student Perspective" (Frey & Birnbaum, 2002) was used. The survey includes 12- item Likert type questions and two open-ended questions. The survey was translated to Turkish by the author and it was translated back to English by another Turkish scholar in order to increase the reliability of the translations. Based on comparisons and revisions, the final Turkish version of the survey was created. After converting the negative statements, the reliability of the survey was calculated as Cronbach's alpha = 0.82, which indicates that it is a reliable survey. Data for this study were collected in fall 2010.

The data were collected from 211 pre-service teachers (116 female - 95 male) in one of the large Turkish Universities. The participants were junior and senior students studying at three different teacher education departments (66 elementary, 84 social studies, and 61 science education). All of the participants were voluntarily participated in the study. The survey was given to the participants in different classes. The participants generally completed the survey in 15 -20 minutes.

The quantitative part of the data was analyzed by using SPSS (18.0). Descriptive statistics was calculated for each question. The mean scores for responses given to the survey questions were calculated (strongly disagree= 1, strongly agree= 5). The qualitative part of the data was analyzed by using inductive analysis.

RESULTS

In order to answer the first research question, descriptive statistics was calculated. Table 1 shows the mean and the percentages of the responses given by participants to each statement. As seen in Table 1, the majority of the participants (89%) have positive attitudes toward PowerPoint presentations (Question 1, M= 4.01, out of 5). An analysis of the responses given for each statement also indicated that pre-service teachers have positive attitudes towards PowerPoint presentations. The qualitative data from the second part of the survey also confirmed this finding. The data analysis showed that vast majority of the participants (191 participants = 90.5 % of the total) would like to see more PowerPoint presentations in their future classes.

In order to answer the second research question, both qualitative and quantitative parts of the survey were analyzed. Data analysis suggested that there are several reasons why pre-service teachers prefer to see PowerPoint presentations. One of the most significant findings of the study indicated that students prefer PowerPoint presentations because a majority of them (89%) believed that they helped to study for course exams (M= 4.21, out of 5). More importantly, almost half of the participants (47%) strongly agreed with this view. Therefore, it was the most prevalent reason why pre-service teachers prefer to see PowerPoint presentations in their future classes. This popular reason may come from students' beliefs that it is enough to study handouts for preparing for exams.

The second widespread reason why pre-service teachers prefer to see PowerPoint presentations was their beliefs that PowerPoint presentations hold their attention (M=4.09). A majority of the participants (89%) agreed with that PowerPoint presentations hold their attention during the class. Another reason for pre-service teachers' preferences was the role of visual images presented in PowerPoint presentations on the retention of the content for exams. A majority of the participants (88%) believed that visual images presented in PowerPoint presentations help them to recall content during exams (M=4.01). Similarly, 77% of the students indicated that they do not prefer bullet-point, text-only PowerPoint presentations over presentations with audio, video, or graphics. Many students (84%) also believed that PowerPoint presentations help to emphasize key points during lectures (M=3.92) while 77% of the participants believed that professors who use PowerPoint presentations are more organized during their presentations.

Students' responses to the question why they prefer to see PowerPoint presentations were listed in Table 2. As seen in Table 2, a majority of the participants prefer to see PowerPoint presentations for several reasons. The most widespread response was the retention. Many pre-service teachers in the study believed that PowerPoint presentations provide long-term retention of information and help them to understand the content. Some examples of students' responses are provided as follows:

> "I would like to see it more because PowerPoint presentations show the main concepts and help them stay in mind for longer period" (P#6).
> "Yes I would like to see more because I believe they increase the retention of knowledge in mind" (P#46).

Table 1: Percentages of the responses given by participants for each statement.

	Strongly Disagree SD (%)	Disagree D (%)	Neutral N (%)	Agree A (%)	Strongly Agree SA (%)	Mean
1) PowerPoint presentations hold my attention.	2	7	2	57	32	4.09
2) PowerPoint presentations increase the likelihood of inappropriate classroom behavior.	13	53	17	16	2	2.42
3) I prefer traditional lectures using a blackboard or whiteboard to PowerPoint presentations.	25	45	5	14	11	2.41
4) Power Point handouts help me to take better notes during classroom lectures.	6	11	9	54	21	3.73
5) Handouts printed from PowerPoint presentations help me to study for course exams.	5	4	2	42	47	4.22
6) Professors who use PowerPoint presentations are more organized during their presentations.	4	6	10	57	24	3.91
7) I prefer bullet-point, text-only PowerPoint presentations over presentations with audio,video, graphics.	29	48	5	9	9	2.21
8) Visual images presented in PowerPoint presentation lectures help me to recall content during exams.	5	5	2	59	29	4.01
9) I am less motivated to attend class when PowerPoint presentations are used during the lecture.	21	53	9	11	6	2.28
10) PowerPoint presentations help to emphasize key points during lectures.	3	6	7	62	22	3.92
11) I have a positive attitude towards PowerPoint presentations.	4	4	3	64	25	4.01
12) I am less likely to attend class when the professor posts PowerPoint handouts to the Web.	18	39	25	14	4	2.48

Taking notes more easily with PowerPoint was the second common response given by the participants. Many participants indicated that they prefer to see PowerPoint presentations since they provide a summary of the topics and highlight important points. Increasing their motivation, and getting their attention were other popular responses provided by the participants. Participants also believed that PowerPoint presentations should be used since it is easier to prepare for exams with handouts. For example, participant #5 stated that "I think I am getting better prepared with both my notes and PowerPoint handouts". There have been few students stated that they prefer to see PowerPoint if they are carefully prepared and properly used. For example, participant #7 stated that "sometimes I want to see; sometimes I do not because the most difficult topics can be passed quickly by pushing the buttons".

Although the majority of the participants stated that they prefer to see PowerPoint presentations in their future classes, few students (7% of the participants) indicated that they did not want to see PowerPoint presentations for several reasons. One of the reasons indicated by participants who did not want to see PowerPoint presentations was that PowerPoint presentations were not appropriate for every topic. For example, participants #18 stated that "I would like to see PowerPoint presentations in social science courses but not prefer to see in science and math courses". Other reasons given by the participants may listed as passing the slides too quickly, not being in detailed, using too much, not preparing properly, not being explanatory, not allowing discussion much, and distracting.

Table 2: Students' reasons why they prefer to see (or not to see) PowerPoint presentations.

Students' responses	**Frequency**
Prefer to see because;	
Retention	53
Taking notes	39
Help to understand topics	38
Motivation	35
Getting attention	34
Visual effects/learning	31
Highlighting important points, summary	25
Entertainment	19
Planning well	17
Preparing for exams	12
Easy to follow	10
Time saving	7
Others (easy to prepare, concrete, active, achievement etc.)	5
Prefer to see with conditions	
If prepared to summarize topics	2
If prepared depending on needs	1
If use properly	1
If included interpretation	1
If it is explanatory	1
Not prefer to see because;	
Not necessary for some topics	4
Sliding too quickly	1
Not in detail	1
Too much used	1
Distracting	1
Not allowing discussion much	
No response	6

Students' responses to open-ended questions confirmed the findings of the survey. Very few students stated that they did not prefer to see PowerPoint presentations for some reasons such as sliding too quickly, being not appropriate for every topic, not always being necessary, using too much, distracting their attention. The participant #179 stated that "do not want to see because the presenter may not explain topics in detail and may be limited, it is unnecessary to see the same thing you heard". Six of the participants left unanswered to this question.

In order to answer the third research question, open-ended questions in the second part of the survey were analyzed. Table 3 shows participants' suggestions of the ways to improve the effectiveness and the quality of PowerPoint presentations. One of the most prevalent suggestions indicated by more than half of participants (128 participants = 61 % of the total) was that more visuals including pictures, photos, videos should be placed in PowerPoint presentations to improve the quality and usefulness of PowerPoint presentations. For example, the participant #137 indicated that "more visuals, pictures, or videos should be used if there is only text, it can be boring". Another participant (#5) stated that "in order to become more useful, PP presentations should be supported by visual effects especially videos related to the content that helps us comprehend and increase our motivation".

Table 3: Pre-service teachers' suggestions of the ways to improve the effectiveness of PowerPoint presentations

Suggestions	**Frequency**
Adding more visuals, pictures, videos, sound	128
Providing important points/key words Less information	36
Providing handouts beforehand	17
Not reading directly	9
Using appropriate font size	8
Not using always	7
Not being too long	7
Not passing slides quickly	7
Using appropriate colors	6
Connection to daily life	6
Being interesting	6
Providing student participation	4
Preventing technical problems	3
Balancing texts and images	3
Being fun	2
Others (darkness, music, prepared by students etc)	3
No response/idea	20

A number of the participants suggested that handouts should be given before the class so that students can follow during the lectures and take additional notes on it. For instance, the participant #88 stated that "If the handouts given beforehand, we will be able to add any explanation made by teachers on our handouts". Some other participants indicated that they want to have handouts for preparing exams. The following quotations are some examples of participants' responses.

> "Handouts should be given in order to increase achievement on exams" (P#85).
> "I believe that providing handouts helps not only learning but making study easier for exams" (P#75).

Making presentations interesting and fun were other suggestions made by some participants. Participants indicated that they did not want the instructor read the text directly without interpreting or giving examples from daily life. Some of the participants suggested that the instructor should provide enough time before going to the next slides, should not use PowerPoint presentations too much, and should provide student participation by either asking questions or having them participate in activities. Other suggestions were related to physical structures of PowerPoint presentations such as picking up appropriate colors, font size and text type for effective presentations. Twenty of the participants did not provide any suggestions for improving the quality of PowerPoint presentations.

DISCUSSION

The findings of the current study provide valuable insights about why pre-service teachers prefer to see PowerPoint presentations in their future classes and what they suggest in order to improve the quality and effectiveness of the PowerPoint presentations. The results of the current study indicated that pre-service teachers have a positive attitude toward PowerPoint presentations and would like to see more in their future classes. This finding is consistent with the findings of other studies (Apperson, Laws, & Scepansky, 2008; Can, 2010; Craig & Amernic, 2006; Kahraman, Çevik, & Kodan, 2011; Levasseur & Sawyer, 2006; Perry & Perry, 1998; Susskind, 2005; Uz, Orhan, & Bilgiç, 2010).

Among many reasons why pre-service teachers prefer to see more PowerPoint presentations, the most significant and common one was pre-service teachers' beliefs that it is easier to prepare with PowerPoint handouts for exams. Students may think that it is enough to study PowerPoint presentations handouts for preparing on exams. This finding is also consistent with Frey & Birnbaum's (2002) study showed that students think PowerPoint presentations help them to study for the course exams. However, this situation may be considered as a disadvantage of PowerPoint presentations if students think that it is enough to study only handouts from Powerpoint presentations for the course exams. In the literature this disadvantage was discussed by Gier and Kreiner (2009) stated that students might falsely believe that if they study only what is on the PowerPoint slides that they will do well on the exams. This could be a reason why many studies did not find the significant effect of PowerPoint presentations on student learning (Apperson, Laws, & Scepansky, 2006; Bartsch & Cobern, 2003; Daniels, 1999; Savoy, Proctor, & Salvendy, 2009).

Another important finding of the current study was the common belief that PowerPoint presentations hold their attention. This point was consistent with Szabo & Hastings's (2000) study. However, the current study indicated that Turkish Pre-service teachers are more likely to have this belief than their counterpart in Frey & Birnbaum's study (2002). According to the current study, Turkish pre-service teachers are more likely to think that visual images presented in PowerPoint presentations help them to recall content during the exams than their counterpart in Frey & Birnbaum's study (2002). This could be the reason why a majority of the participants in the current study suggested that they would like to see more visuals, pictures, diagrams, or videos in PowerPoint presentations. In the current study, Turkish pre-service teachers seemed to be in favor of more visuals than texts, confirmed by Açıkalın's (2009) study indicated that Turkish pre-service teachers focus on more visuals on their Internet search.

The present study indicated that Turkish pre-service teachers would like to have handouts from PowerPoint presentations beforehand. However, the reason for this suggestion was not due to the lack of attendance as indicated by Frey & Birnbaum's (2002) study. Turkish pre-service teachers in the present study did not indicate that they were less likely to attend class when PowerPoint presentations used and handouts from PowerPoint presentation given by hand or posted on the web. In the current study, some suggestions made by Turkish pre-service teachers were discussed in the literature (Kahraman, Çevik, and Kodan, 2011) that PowerPoint presentations should be prepared carefully and used properly.

CONCLUSIONS

PowerPoint presentations are widely used in education and discussed in the literature. The literature indicates that pre-service teachers have positive attitudes toward PowerPoint presentations although the effectiveness of PowerPoint presentations is inconclusive. This situation brings an important question how to improve the quality of PowerPoint presentations in order to increase student learning. In terms of this aspect, the present study may have valuable contribution to the literature. Possible recommendations based on the findings of the current study can be summarized as follows:

1. The quality of PowerPoint presentations depend on mainly the instructor. Instructors should have enough knowledge and ability how to prepare PowerPoint presentations in terms of not only physical structure but also the content. PowerPoint presentations could be turned to typical teacher-centered instruction if instructors do not provide student participation by either asking discussion questions or having students participate in activities.
2. PowerPoint presentations are valuable tools to get student attention at the beginning of the instruction. The most important point here is to keep students attention and interest during the instruction. Visuals including pictures, animations or videos related to content may be helpful to keep student attention until the end of the instruction. However, since unrelated visuals may reduce student comprehension, it is important to pick up appropriate visuals and make the connection with topics. Keeping the balance between the text and the visuals is a key issue to prepare effective PowerPoint presentations.
3. PowerPoint presentations can be more useful if they are clearly organized and briefly summarize the topic. PowerPoint presentations with longer text and slides can have students lost their attention and get boring. PowerPoint presentations should have less but important information.
4. Although PowerPoint presentations are well-prepared, they should not be used all of the times. PowerPoint presentations should be supported by a variety of student-centered methods in which students may actively participate such as activities, experiments, group works, case studies, and discussions.
5. Handouts from PowerPoint presentations can be given to students beforehand. However, if the instruction does not depend on only the PowerPoint presentation, students probably will not think that the course exam will be covered only the handouts from PowerPoint presentations given by the instruction. Therefore, in this way, the attendance problem indicated in the literature will be also solved.

Moreover, based on the findings of the present study, further research is needed in order to investigate the effects of visuals, photos, videos presented on the PowerPoint presentations on student learning and to compare any differences of student learning between students given to handouts beforehand and students who do not receive any handouts.

References

Açıkalın, M. (2009). Pre-service elementary teachers' beliefs about use of the Internet in the social studies classroom. *European Journal of Teacher Education, 32*(3), 305-320.

Apperson, J. M., Laws, E. L., & Scepansky, J. A. (2006). The impact of presentation graphics on students' experience in the classroom. *Computers & Education, 47*(1), 116-126.

Apperson, J. M., Laws, E. L., & Scepansky, J. A. (2008). An assessment of student preferences for PowerPoint presentation structure in undergraduate courses. *Computer & Education, 50*, 148-153.

Bartsch, R. A., & Cobern, K. M. (2003). Effectiveness of PowerPoint presentations in lectures *Computers & Education, 41*, 77-86.

Brown, V. (2007). The power of PowerPoint: Is it in the user or the program? *Childhood Education, 83*(4), 231-233.

Can, Ş. (2010). Attitudes of pre-service teachers from the department of elementary education towards the effects of materials use on learning. *The Turkish Online Journal of Educational Technology, 9*(2), 46-54.

Clark, J. (2008). PowerPoint and Pedagogy: Maintaining student interest in university lectures. *College Teaching, 56*(1), 39-45.

Craig, R. J., & Amernic, J. H. (2006). PowerPoint presentation and the dynamics of teaching. *Innovative Higher Education 31,* 147-160.

Creed, T. (1997). PowerPoint, no! Cyberspace, yes! *The National Teaching and Learning Forum, 6*, available from http://www.ntlf.com/temp/backup/powerpoint.htm

Daniels, L. (1999). Introducing technology in the classroom: PowerPoint as a first step. *Journal of Computing in Higher Education, 10*(2), 42-56.

DenBeste, M. (2003). PowerPoint, technology and the web: More than just an overhead projector for the new century? *The History Teacher, 36*(4), 491-504.

Frey, B. A., & Birnbaum, D. J. (2002). *Learners' perceptions on the value of PowerPoint in lectures.* Pittsburgh, PA: University of Pittsburgh (ERIC Document Reproduction Service No. ED 467192).

Gier, V. S., & Kreiner, D. S. (2009). Incorporating active learning with PowerPoint-based lectures using content-based questions. *Teaching Psychology, 36*(2), 134-139.

Hlynka, D., & Mason, R. (1998). 'PowerPoint' in the classroom: What is the point? *Educational Technology, 38*(5), 45-48.

Kahraman, S., Çevik, C., & Kodan, H. (2011). Investigation of university students' attitude toward the use of PowerPoint according to some variables. *Procedia Computer Science, 3*, 1341-1347.

Levasseur, D. G., & Sawyer, J. K. (2006). Pedagogy meets PowerPoint: A Research review of the effects of computer-generated slides in the classroom*. The Review of Communication, 6*(1-2), 101-123.

Lowry, R. B. (1999). Electronic presentation of lectures-Effect upon student performance. *University Chemistry Education, 3*, 18-21.

Mayer, R. E. (2001). *Multimedia learning*. New York: Cambridge University Press.

Moreno, R., & Mayer, R. E. (2000). A coherence effect in multimedia learning: the case for minimizing irrelevant sounds in the design of multimedia instructional messages. *Journal of Educational Psychology, 92*, 117–125.

Perry, T., & Perry, L. A. (1998). University students' attitudes towards multimedia presentations. *British Journal of Educational Technology, 29*(4), 375-377.

Savoy, A., Proctor, R. W., & Salvendy, G. (2009). Information retention from PowerPoint and traditional lectures. *Computers & Education, 52*, 858-867.

Schraw, G. (1998). Processing and recall differences among seductive details. *Journal of Educational Psychology, 90*, 3–12.

Susskind, J. E. (2005). PowerPoint's power in the classroom: Enhancing students' self efficacy and attitudes. *Computer & Education, 45,* 203-215.

Szabo, A., & Hastings, N. (2000). Using IT in the undergraduate classroom: Should we replace the blackboard with PowerPoint? *Computers & Education 35*(3), 175-187.

Tufte, E. R. (2006). *The cognitive style of PowerPoint: Pitching out corrupts within* (2nd ed.). Cheshire, CT: Graphics.

Uz, Ç., Orhan, F., & Bilgiç, G. (2010). Prospective teachers' opinions on the value of PowerPoint presentations in lecturing. *Procedia Social and Behavioral Sciences, 2*, 2051-2059.

