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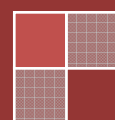
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Message from the Editor-in-Chief

Dear Colleagues,

Awareness of fast-changing techniques associated with technological change is important in maintaining effective, successful, and competitive educational systems. People with limited vision only focus on technological hardware is isolation from cognitive/behavioral techniques and associated cultural patterns. This simplistic view of technology as hardware may stem from the fact that as the functions and devices of technology increase in complexity, their internal operation becomes a marvel in itself, separate from their use and socio-cultural context. Historically, most technology and related techniques were experienced in direct connection with the goal or product of the technological process (e.g., a traditional artist learning how to construct and use different types of paint brushes understands, appreciates, and sees the connection of the paint brush technology to the finished product). However, as technology became more complex and indirect in its contribution to the goal or product, people had less direct knowledge and ability to with unexpected technical problems. For example, a university staff is given a computer database system scheduling courses and meetings, yet they are resistant and revert to word-of-mouth arrangements because they are not fully trained or aware of how to interact with the database—it's weaknesses and potentials.

Thus, instead of techniques related to understanding technical systems and their direct relationship with the environment or goal, a whole new level of human technique evolves which consists of interacting and dealing with constraints of technology (symbolic manipulations like the keyboard interactions that a graphic artist learns to use a computer art application). These kind of technical skills (i.e., techniques) have often been negative and less meaningful to people because human-machine interactions are often structured by inherent technological limitations or nonhuman aspects of the technology. Additionally, technology and related techniques involve new sociocultural structures which can be problematic in themselves.

In summary, whereas in ancient Greece technology was considered to be the study of knowledge and skills involved in specialized arts (i.e. technologia), technology and associated techniques have now permeated human culture, experience, and cognition. Strangely enough, the nature of such profound changes in human experience is difficult to be aware of and define. Nonetheless, understanding the impacts of technology and its relationship to human learning is an important factor in pursuing liberal ideals associated with a fully functioning educational system. The next section discusses how technology and technique have been ignored or misunderstood as having a compartmentalized relationship with science and machines. This superficial view of technology and technique inhibits understanding major determinants of human thinking, learning, and culture.

The Turkish Online Journal of Educational Technology (TOJET) is a refereed international online journal sponsored by Sakarya University, Governor State University and TASET (The Association of Science, Education and Technology). The main mission of TOJET is to diffuse how to use technology in education all over the World.

TOJET thanks the guest editor of this issue is Prof. Dr. J. Michael Spector, University of North Texas, USA for all his effort and support to the journal.

We greatly appreciate the valuable contributions of the editorial board who have acted as reviewers for one or more submissions of this issue. TOJET's reviewers are drawn quite widely from all over the world with a concentration for this issue on the Europa, USA, Asia, Turkey, and others.

TOJET is interested in academic articles on the issues of educational technology. The articles should talk about using educational technology in classroom, how educational technology impacts learning, and the perspectives of students, teachers, school administrators and communities on educational technology. These articles will help researchers to increase the quality of both theory and practice in the field of educational technology.

TOJET will organize the 14th International Educational Technology Conference (IETC 2014) on September 03-05, 2014 at AIC in Chicago, USA. The web page of IETC is "www.iet-c.net".

Call for Papers
TOJET invites article contributions. Submitted articles should be about all aspects of educational technology and may address assessment, attitudes, beliefs, curriculum, equity, research, translating research into practice, learning theory, alternative conceptions, socio-cultural issues, special populations, and integration of subjects. The articles should also discuss the perspectives of students, teachers, school administrators and communities.

The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJET. All authors can submit their manuscripts to tojet.editor@gmail.com for the next issues.

October 01, 2013
Editor

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Table of Contents

A CASE STUDY ON THE EFFECTS OF AN L2 WRITING INSTRUCTIONAL MODEL FOR BLENDED LEARNING IN HIGHER EDUCATION

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ABSTRACT
This case study explores EFL (English as a foreign language) students' perceptions toward a prototype of an instructional model for second language (L2) writing in blended learning and the effects of the model on the development of L2 writing skills in higher education. This model is primarily founded on the process-oriented writing approach combined with various types of writing activities in both online and offline environments. It was observed that the participants of the study perceived the blended learning model to be useful and helpful for the improvement of their writing skills. In addition, it was found that the participants in the three focus groups received higher scores for their writing at the end of the study. Based on the main findings, modifications have been made to the model and further suggestions and implications are provided.

INTRODUCTION
As second language (L2) writing is considered very complex for L2 learners, a need for systematic and comprehensive writing instruction is heightened. The teaching and study of L2 writing involves various factors: the writing process, peer and teacher responses, writing activities, and writing instructions (Harmer, 2004; Raimes, 1983; Williams, 2005). Also, L2 learners are required to address content, organization, structure, and mechanics appropriately to convey meaning through writing simultaneously (Brown, 2007; Raimes, 1983; Tribble, 1996). For L2 learners who do not have sufficient knowledge of the four writing components - content, organization, structure, and mechanics - L2 writing is very complicated and, consequently, they often encounter a number of linguistic difficulties with vocabulary and sentence construction (Chan, 2010; Zhou, 2009), reporting verbs (John, 2012; Thompson & Ye, 1991) and cohesive devices (Hinkel, 2001; Mu & Carrington, 2007). One way to resolve these problems is to give learners a number of opportunities to write and a variety of writing activities and instructions on the four components in a systematic and organized manner. Although many L2 learners write and revise their drafts several times, they are still often unsatisfied with the writing process due to the limited number of class sessions and insufficient time in a conventional classroom. Thus, providing sufficient writing opportunities and environments for interaction and communication with peers and a teacher regardless of time or place, known as blended learning, which combines the positive attributes of online and face-to-face instruction, has been suggested (Bañados, 2006; Grgurović, 2011; Hinkelman & Gruba, 2012; Nicolson, Murphy & Southgate, 2011; Yoon & Lee, 2010). In a blended learning environment, L2 learners are able to interact with peers and a teacher using a variety of computer-mediated communication (CMC) tools (Lafford & Lafford, 2005; Lee & Pyo, 2003). Despite the promising features of blended learning, it is rarely employed in L2 writing class; furthermore, little research has been conducted on the teaching and learning of L2 writing or on the L2 writing process and instruction in a blended learning environment.

In order to implement a blended learning environment effectively and efficiently in L2 writing, a systematic and comprehensive instructional model is an integral element. In L2 writing pedagogy, it has been asserted that an integrated L2 writing approach combines the process approach and the genre approach with other aspects of writing and writing instruction (Min, 2011). Taking into account the current writing approaches and writing activities and instructions, as well as the attributes of online and offline environments, an instructional model for L2 writing in blended learning is urgently needed. Therefore, the purposes of the study are to examine the perceptions of L2 learners in higher education toward a prototype of an instructional model for L2 writing in blended learning and its effects on the development of L2 writing skills and to propose a proper model of L2 writing in blended learning. The research questions for the above purposes are as follows: 1) What are the students' perceptions toward the model?; 2) What are the effects of the model on the development of writing skills?; and 3) What is the appropriate model for teaching and learning L2 writing in a blended learning environment?

BLENDED LEARNING AND L2 WRITING
Blended learning in language teaching and learning

Since blended learning was introduced to both the academic and corporate fields, there have been various attempts to employ blended learning in the language teaching field (Behjat, Yamini & Bagheri, 2011; Grgurović, 2011; Miyazoe & Anderson, 2010; Neumeier, 2005; Yoon & Lee, 2010). Featuring a combination of instructional modalities or methods, blended learning is defined as a system that combines face-to-face instruction with computer-mediated instruction (Graham, 2006, p. 5). Through the blended learning system, instructors and learners are provided with the benefits of enhanced pedagogical richness, the active use of teaching and learning strategies, multiple platforms for interaction and communication, and an increased access to knowledge (Graham, 2006; Graham, Allen & Ure, 2005; Osguthorpe & Graham, 2003).

In the English Language Teaching (ELT) field, Yoon and Lee (2010) further narrowed the term, blended learning in ELT and defined it as "bringing together the positive attributes of online and offline education, including instructional modalities, delivery methods, learning tools, etc., in relation to language teaching and learning approaches and methods in order to reinforce learning process, to bring about the optimal learner achievement, and to enhance the quality of teaching and learning (p. 180)." This definition not only includes the core themes of blended learning, such as the combination of instructional modalities, delivery methods and learning tools, but also emphasizes the necessity of association with approaches and methods of language teaching and learning.

In English as a Foreign Language (EFL) contexts like Korea, where language input is provided in formal classroom settings with a limited number of sessions, blended learning has been recognized as an alternative learning environment due to the increased time for language input and extended learning setting both in online and offline environments (Lee & Pyo, 2003; Yoon & Lee, 2010). Murphy and Southgate (2011) proposed that for the design of blended learning systems and materials in language teaching contexts a wide range of teaching modes, tools, and resources be integrated to meet learners' needs and to achieve academic goals and learning outcomes. As Garrison and Kanuka (2004) indicated that learning experiences in blended learning are to be integrated, not simply mixed together, in language teaching or learning, a variety of activities and tasks are to be organized systematically in relation to the modes, tools, and available resources considering the language teaching and learning approaches and methods, learner characteristics and contexts.

L2 writing

In order to effectively write in L2, learners need to possess a variety of skills. Raimes (1983) presented nine features that produce a piece of writing: content, the writer's process, audience, purpose, word choice, organization, mechanics, grammar, and syntax. Tribble (1996) also suggested four types of knowledge that writers need - content knowledge, context knowledge, language system knowledge, and writing process knowledge - a daunting task for any L2 writer.

For the teaching and learning of L2 writing, various approaches have been suggested such as the controlled-to-free approach, the free-writing approach, the paragraph-pattern approach, the communicative approach, the process approach and the genre approach (Hyland, 2002; Raimes, 1983; Tribble, 1996; Williams, 2005). Of these, the process approach has been a mainstay of L2 writing pedagogy. Ever since Raimes (1985) identified that the writing process is recursive, the process of writing has been targeted by researchers. Williams (2005) suggested four stages of the writing process: getting started, creating the first drafts, revising, and editing. Williams asserted that L2 learners have to spend more time on all stages of the writing process and need more discussion and feedback than native speakers (L1 writers). Similar to Williams (2005), Harmer (2004) suggested four main elements in the writing process: planning, drafting, editing (reflecting and revising), and the final version. These were presented via the process wheel, showing the many directions that writers can take. Tribble (1996) also suggested the writing process is composed of prewriting, composing (drafting), revising, and editing, indicating that the whole process is not a fixed sequence but rather a dynamic and unpredictable process.

Although the process writing approach has been adopted in L2 writing classrooms, some critiques have been made: an L1-oriented process writing approach might be inappropriate for L2 learners in different social and educational contexts from L1 contexts (Delpit, 1988; Holliday, 1994). From this argument, a post-process approach in the post-process movement has been suggested (Atkinson, 2003; Trimbur, 1994) putting an emphasis on the genre (Hyland, 2007; Swales, 2004; Tardy, 2012), other aspects of writing and writing instruction, and a final product as well as the writing process. Min (2011) suggested a principled eclectic approach for foreign language writing instruction, indicating the integral need to search for the most effective and efficient approach to enhance students' writing skills. The principled eclectic approach adapts imported mainstream instructional approaches to local needs and stresses the creation of local practices.

There have been a few studies addressing blended learning in L2 writing (Behjat, Yamini & Bagheri, 2011; Ferriman, 2013; Miyazoe & Anderson, 2010; Yoon & Lee, 2010). These studies indicated that blended learning environments foster interaction among students and teachers and have a positive impact on the development of L2 writing skills. Yoon and Lee (2010), particularly, in a Korean university setting, proposed a model for blended learning in L2 writing (BLW) and found that the model was received positively by students and that there was an increase in high test results.

METHODOLOGY
Participants
The participants of the study consisted of 51 English pre-service teachers in two universities in Seoul, Korea: H University and K University. The participants were enrolled in courses entitled "Logical Thinking and Writing in English" for pre-service teachers. This was a required course for pre-service teachers and taught by a bilingual Korean instructor. The course in H University was open to graduate students and the course in K University was open to both undergraduate and graduate students. A total of 25 graduate students enrolled in the course in H University, and 18 graduate students and 8 undergraduate students enrolled in the course in K University. H University's course comprised of 3 males and 22 females, K University's of 2 males and 24 females: a total of 5 males and 46 females.

The participants of both courses were divided into groups of four or five for the tasks. Three groups in K University were selected for inclusion in focus groups so that the improvement in their writing skills could be investigated and qualitative data gathered. The groups were heterogeneous in terms of writing proficiency level: high-beginning, intermediate, and high-intermediate. Their writing proficiency was based on their results from a pre-testing stage. The participants of the three groups (A, B, and C) are as seen in Table 1. Pseudonyms have been used to protect identities.

Table 1: Participants of three groups

Group	Name	Writing proficiency	Status	Gender
A	Eunsung	High-intermediate	Undergraduate	Female
	Mihye	Intermediate	Undergraduate	Female
	Sungjin	Intermediate	Undergraduate	Female
	Semi	High-beginning	Undergraduate	Female
B	Jihyun	High-intermediate	Graduate	Female
	Hyeyoung	High-intermediate	Graduate	Female
	Kyunghee	Intermediate	Graduate	Female
	Insung	High-beginning	Graduate	Male
C	Garim	High-intermediate	Undergraduate	Female
	Junghyuk	Intermediate	Undergraduate	Male
	Jungmin	High-beginning	Graduate	Female
	Miyoung	High-beginning	Graduate	Female

Data collection instruments and procedures
In order to obtain data for this study, quantitative and qualitative data were gathered. Quantitative data sources included a questionnaire that used semantic differentials of six bipolar adjective scales (0-5) with six items of usefulness, easiness, interest, motivation, helpfulness and satisfaction of a prototype of an instructional model for L2 writing in blended learning. The questionnaire was designed to measure participants' perceptions and was administered in class on week 16 (the final week); 51 questionnaires were completed and returned.

Qualitative data sources included online and offline classroom observations, reflective journal entries, post interviews with the three focus groups, and the focus groups' writing drafts of the pre-test, midterm, and post-test. The classroom observations were undertaken every week throughout the entire semester as non-participant observation in order to gather information on the students' behaviors and interaction. Field notes and reflective observation logs were taken and offline peer response sessions of three focus groups were voice recorded. The participants were required to write reflective journals after producing a final draft in each writing cycle in order to reflect on the writing process, comments from peers and teacher, writing activities and instruction. They were allowed to write the reflective journals in Korean. Focus group interviews were conducted at the end of the course as semi-structured interviews in Korean. The interviews were all voice recorded and notes were taken during the interviews. The interviews consisted of experience and behavior, opinion and values, feeling, and background questions regarding previous experiences of English writing in

blended learning and the model. The pre-test, midterm- and post-tests were given in week 1, 8, and 16 of the semester. The tests were to write an argumentative essay on the effectiveness of homework, the need of peer assessment in language learning, and the necessity of supervised night self-study, respectively. The 40-minute tests were administered in class and the participants were required to handwrite.

Implementing a prototype of an instructional model for L2 writing in blended learning
This study was conducted over two semesters from March 2012 to December 2012 in classes entitled Logical Thinking and Writing in English. The course at H University ran from March 2012 to June 2012, the course at K University from September 2012 to December 2012. Over 16 weeks, H University's participants met for two hours each week, K University's for three hours. For these courses, a prototype of an instructional model for L2 writing in blended learning was implemented (See Figure 2). The model combines an offline class, where students meet in a conventional classroom, with an online class where students interact with others using CMC tools, such as e-mail, bulletin board system (BBS), blogs and chatting programs taking into account the recursive process of writing and writing activities as well as instruction.

Based on the process-oriented writing approach, the model possesses five stages: getting ready to write, drafting, revising, producing the final draft, and reviewing. In the first stage, students met in an offline class and, on selected topics, performed pre-writing activities such as listing, outlining, clustering, brainstorming and mind-mapping individually, in groups and as a whole class, using various learning tools. In the drafting stage of while-writing, the students were to produce first drafts, focusing on content, organization and structure, and to upload them to each group's BBS in a class BBS. In particular, the students were supposed to write their first drafts, deliberating the organization of content and structure using corpus tools and web content such as video clips, articles, learning web pages, etc. related to each topic. The students were required to conduct an online peer response session in each group, using a tag-line function in BBS, e-mail asynchronously or using chatting programs. After the online peer response sessions they were asked to revise their first drafts, produce a second draft, and upload it to the class BBS. In the revising stage, the students conducted the offline peer response sessions, collaboratively working on second drafts. The teacher also responded to students' second drafts and provided feedback for the students. They were provided with writing activities such as controlled and guided writing, repairing sentence, sentence combining, parallel writing, and so on. In the fourth stage, the students produced the final draft based on feedback from peers and the teacher in the online environment and uploaded it to the class BBS. The teacher responded to the students' final drafts and provided feedback. After producing the final draft, the students wrote a reflective journal to reflect on the writing process, feedback and comments from response sessions. The journal entries were also uploaded to the class BBS and recommended that they be shared to extend the learning experiences. Finally, in the reviewing stage, they evaluated their final drafts and conducted group discussions based on the reflective journals. This stage is distinguished from the pre-existing writing process, such as the writing process suggested by Williams (2005), Harmer (2004), and Tribble (1996). In order to reinforce learning and writing experiences throughout the one cycle, the students need to be provided explicit opportunities for evaluating and reviewing what they did in the one cycle with peers and the teacher.

Methods of data analysis
Quantitative data from the questionnaire was analyzed using SPSS for descriptive statistics in order to investigate the participants' perceptions toward the model for L2 writing in blended learning. Reliability analysis for the questionnaire was conducted. Cronbach's alpha value was 0.97 for standardized items, showing very high reliability for the items in the questionnaire. Field notes and reflective observation logs collected through classroom observation were categorized into either description or reflection. The field notes and observation logs were analyzed descriptively. The collected reflective journal entries from the focus groups were read through by the researchers to investigate emergent themes regarding perceptions toward the model. The instances of accounts were categorized into the perceptions toward the stages of the model and translated into English. The focus group interviews were also transcribed and translated into English. The interview transcripts were read through and then analyzed and categorized. The drafts of pre-test, midterm- and post-tests were scored using the rubric for academic writing based on the scoring rubric for paragraph writing (Yoon & Lee, 2010). The rubric consists of four main components: content (30 points), organization (30 points), structure (20 points), and mechanics (20 points). The drafts were scored by two raters, and Pearson's r for all the drafts was over 0.8 in this study.

RESULTS AND DISCUSSION
Perceptions toward a prototype of an instructional model for L2 writing in blended learning
The participants were found to have positive perceptions toward a prototype of an instructional model for blended learning in L2 writing as seen in Table 2. They considered it useful (4.2745), interesting (3.3922), motivating (3.6667), helpful (3.9020) and satisfying (3.7843).

Table 2: Perceptions toward the model

Feature	N	Mean	SD
Usefulness	51	4.2745	0.82652
Easiness	51	2.6863	1.17457
Interest	51	3.3922	1.09688
Motivation	51	3.6667	1.12546
Helpfulness	51	3.9020	1.13587
Satisfaction	51	3.7843	1.06421

The ample opportunities for writing and response sessions in online and offline environments were seen as the major benefits provided by the model. More than half of the participants (31, 60.8%) had not experienced process-oriented writing, indicating the participants were previously not given sufficient opportunities to write. This model appeared to provide opportunities for producing multiple drafts, revising the drafts, giving and receiving peer feedback, and receiving teacher feedback. The following are excerpts from the participants' comments on the model.

> Eunsung: At first, it was difficult and even scary: English writing. However, as I practiced writing and conducted peer response sessions, following the steps in this course, I realized that English writing was not that difficult. [Reflective journal (RJ)6]
> Jungmin: I am absolutely satisfied with this course. Although I was very despondent due to my lack of writing skills, I thought the process-oriented writing was very interesting. This helps me study English writing by myself. [RJ6]
> Jihyun: I had no idea when I wrote the first draft at the beginning of the semester, and it was very difficult to connect my writing to very specific content related to the major. But as I wrote more and more, I figured out repeated terminologies and organization of English writing. This was very interesting and exciting. [RJ6]
> Semi: *"I liked the peer response sessions provided in this course, utilizing the class BBS and the mobile messenger application, Kakao Talk. Through these sessions, I could recognize mistakes and errors which I had not known before and widen my knowledge of English writing."*

However, easiness (2.6863) was received as less positive than others. It can be attributed to the fact that most of the participants (39, 76.5%) had not had any previous experience of blended learning. They also seemed to have difficulties dealing with the content provided at each stage and considered L2 writing a difficult and challenging skill as seen in the transcripts of the interviews.

> Jihyun: *"It is, of course, not easy to write multiple drafts and upload them to the class BBS in time."*
> Miyoung: *"I liked the content addressed in the classroom, but I felt rushed to finish the tasks and activities. It would be much better if we had enough time to address the content and conduct the tasks and writing activities."*

In Table 3, the participants had positive perceptions toward pre-writing activities in the getting ready to write stage. The participants considered the pre-writing activities useful (4.3922), easy (3.000), interesting (3.5294), motivating (3.8627), helpful (3.9216) and satisfying (3.9216). The participants were observed thinking of ideas and deliberating the organization of content during individual work, and enjoying discussing and sharing the results of individual work during group work in a non-threatening environment. Also, they appeared to appreciate further information and comments provided by the teacher. The following are the excerpts from the participants' reflective journals commenting on pre-writing activities.

> Sungjin: I could gather a lot of information through the pre-writing activity, listing. Pre-writing activities have merits in terms of producing better drafts through a variety of collected information. [RJ1]
> Jungmin: I had recognized that mindmaps are a very powerful technique in writing, but I had rarely used them. I think organizing ideas and expressing them are part of a quite meaningful process. Also, I really liked the websites, such as http://www.okmindmap.com or http://www.lextutor.ca/ because they are useful. [RJ5]

Table 3: Perceptions toward pre-writing activities

Feature	N	Mean	SD
Usefulness	51	4.3922	0.80196
Easiness	51	3.0000	1.14891
Interest	51	3.5294	0.98697
Motivation	51	3.8627	0.84899
Helpfulness	51	3.9216	0.93473
Satisfaction	51	3.9216	0.91309

As shown in Table 4, the participants considered writing multiple drafts, drafting, revising, and producing the final draft performed in the while-writing stage useful (4.3922), motivating (3.7059), helpful (4.2549), and satisfying (3.9412). In particular, they were found to think it very useful and helpful to improve writing skills because it provided sufficient opportunities for writing practice. Although the participants found it difficult to write multiple drafts, they appeared to recognize the benefits of the process-oriented writing approach as presented in reflective journal entries.

> Jihyun: As I wrote the drafts several times throughout the semester, it became more helpful for the development of my writing skills. I think the writing assignments and the instruction are both very necessary, and I appreciate this course since it helped me a lot. [RJ3]
>
> Mihye: The biggest improvement this made to my writing was related to time. I usually spent a long time drafting, but I decided to produce the drafts fast, focusing on the drafts, and I could complete the drafts in one hour. [RJ4]

Table 4: Perceptions toward writing multiple drafts

Feature	N	Mean	SD
Usefulness	51	4.3922	0.69508
Easiness	51	2.3725	1.29554
Interest	51	2.9020	1.06311
Motivation	51	3.7059	1.06384
Helpfulness	51	4.2549	0.84482
Satisfaction	51	3.9412	0.98817

The participants' perceptions toward writing reflective journals are somewhat less positive than the other elements of the model as presented in Table 5. Despite its usefulness (3.7647), the participants showed a low level of interest (2.6471) and motivation (3.0392).

Table 5: Perceptions toward writing reflective journal

Feature	N	Mean	SD
Usefulness	51	3.7647	1.47768
Easiness	51	3.0392	1.26429
Interest	51	2.6471	1.45360
Motivation	51	3.0392	1.42774
Helpfulness	51	3.0784	1.26243
Satisfaction	51	3.2745	1.23415

It can be attributed to the notion that there was a lack of interaction among the participants and the teacher. Since writing reflective journals was considered personal and cognitive work, it remained in individual areas. Some had difficulties writing about the given areas and were overwhelmed and stressed after finishing the entire process. It was also suggested that the reviewing stage needed to be intensified with more explicit consolidation by the teacher to reinforce and to foster further learning as seen in the transcripts of the interview.

> Mihye: *"I was stressed out about writing the first draft and further revising. Also, it was not easy to write the reflective journals and upload them to the class BBS."*
>
> Jihyun: *"I think this course could be much more helpful if the teacher consolidated the entire writing process and content at the end of the cycle. Because we did not address the final drafts in detail, there were some things that I could not fully understand."*

Effects of a prototype of an instructional model for L2 writing in blended learning

As shown in Figure 1, the members of group A showed an increase in scores from the pre-test to the midterm, and the post-test. Eunsung, who is a high-intermediate level student, got 81 points in the pre-test, 86 points in the midterm, and 90 points in the post-test. Although she was knowledgeable of English writing, she seemed to be concerned about content and organization. It was observed that she recognized the importance of content and organization through the writing process and writing activities and often interacted with group members in response sessions in the drafting and revising stages. Mihye, who scored 71 points in the pre-test, also showed an increase of 10 points from the pre-test to the post-test. Mihye was a very hardworking student and completed each task and activity in the stages diligently. Not only did she gain higher scores in the midterm and post-test, but she also gained confidence in English writing and was satisfied with the model as seen in her interview transcript:

> Mihye: *"This course is absolutely helpful for improving individuals' writing skills. I feel a big sense of accomplishment in my writing. At first, I felt some pressure writing the first draft, but as I wrote more and more, I could produce the first draft fast and learn certain strategies. Through this course, I was able to gain confidence in writing and now I even consider myself a good writer."*

For all the members of Group B, there were increases of points from the pre-test to the post-test as seen in Figure 1. Among the group members, Insung gained 59 points in the pre-test, showing a low level of writing proficiency. Insung seemed to have difficulty selecting appropriate words and organizing the content of drafts. However, as he produced drafts and revised them through received feedback from peers and the teacher with the writing activities and instructions in the model, his writing skills improved, gaining six points overall from the pre-test to midterm, and eight points from the midterm to the post-test. The other group members, Jihyun, Hyeyoung, and Kyunghee, were all eager to respond to peers' drafts and participate in the writing activities as well as the writing process, and gained higher scores in the midterm and post-test. Jihyun expressed her satisfaction with this course as seen in the interview transcript.

> Jihyun: *"I am really satisfied with this course. This writing course is very meaningful and helpful because writing opportunities were sufficiently given to the students. I think if this course can be offered every semester, students' writing skills would be a lot better."*
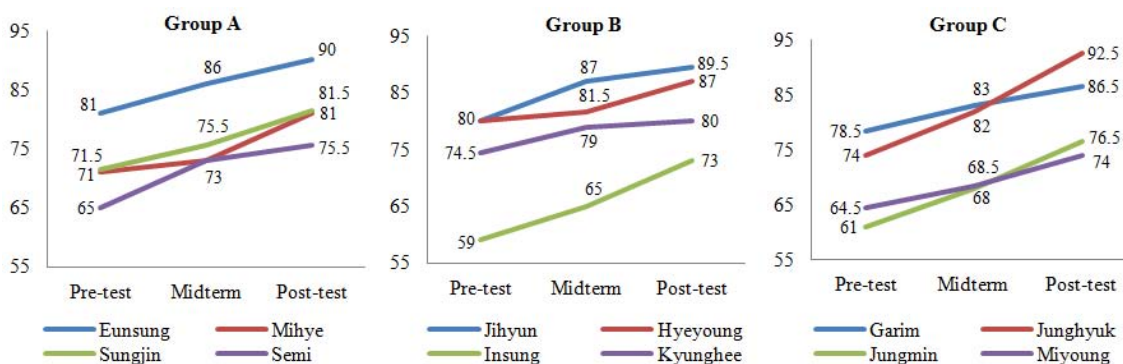
Figure 1: Scores of three groups

Every member in Group C showed increases in points from the pre-test to the post-test as well. Among the group members, Junghyuk's performance was notable. Junghyuk was not able to complete his composition in the pre-test in 40 minutes. The number of produced words was 132, and the number of produced sentences 10. However, he completed his mid-term and post-test composition with 276 words and 15 sentences, and 296 words and 19 sentences respectively. With the increase in quantity of words and sentences, the quality of drafts improved from the pre-test (74) to the post-test (92.5) stage. This improvement can be attributed to Junghyuk performing tasks and activities provided in the model and following the writing process. Junghyuk was observed to interact with other group members in the class BBS, respond to peers' comments and explain the reasons for his writing through the tag-line function. He seemed to be able to acknowledge his weaknesses and thus tried to make as many revisions to the first and second drafts as possible. He also recognized that he could write faster than before and could arrange his ideas in more logical ways as this excerpt from his reflective journal states:

Junghyuk: I think I become more confident and relaxed while I am writing. Now, I organize my

ideas and then start to write from these thoughts for more logical drafts. [RJ3]

Modification of a prototype of an instructional model for L2 writing in blended learning
Based on the main findings, a prototype of an instructional model for L2 writing in blended learning was modified as presented in Figure 2. In order to reduce the burden that the participants bear during the writing process of the model and to provide sufficient time to reflect on the feedback from online peer response sessions, the task of *revising the first draft and producing the second draft* was moved from the drafting stage to the revising stage. The participants were observed to have too heavy a workload in the drafting stage: writing the first draft, conducting online peer response sessions, revising the first draft and producing the second draft all within one week. They seemed to be in a hurry to conduct each task and to not have sufficient time to reflect on comments from peers or to make decisions as to whether the comments were to be incorporated for revisions or not. By revising it, the students' burden can be eased, and ample time is allowed for students to reflect on feedback and deliberate the revision process more thoroughly.

To reinforce the writing process and foster further learning after producing the final draft, *conducting online peer response sessions* in the producing the final draft stage is to be added. The participants in the study were found to rarely address the final draft despite its importance as a product. In order to engage students' attention to the final drafts and promote interaction among the students, the online peer response session is to be added; however, this online peer response session should only be conducted if the students find it necessary. In addition, the reviewing stage is to be intensified to reinforce teaching and learning writing skills. In the prototype model, reviewing was conducted based on the reflective journal entries with evaluation of the final draft by the teacher and students. However, it was found to be insufficient for addressing the tasks and activities provided in the model, so *consolidating the writing process and peer and teacher feedback,* and *setting goals for the next writing cycle* are included. The consolidation provides students with opportunities to review what they have learned in the writing process and to address the important points made. Goal setting also connects problems acknowledged in the writing cycle to improvements that need to be made for further writing cycles.

Also of interest was the participants' use of personal learning devices (PLDs). The participants in the study were observed to utilize various functions of PLDs such as smartphones, iPads or tablet PCs including mobile messenger applications (MMAs) for their response sessions as well as the drafting and revising stages. Using PLDs and MMAs did not require the participants to use computers, and consequently provided flexibility and mobility for communication and interaction regardless of time or place; thus, it is seen as essential to implement PLDs and MMAs as learning tools.
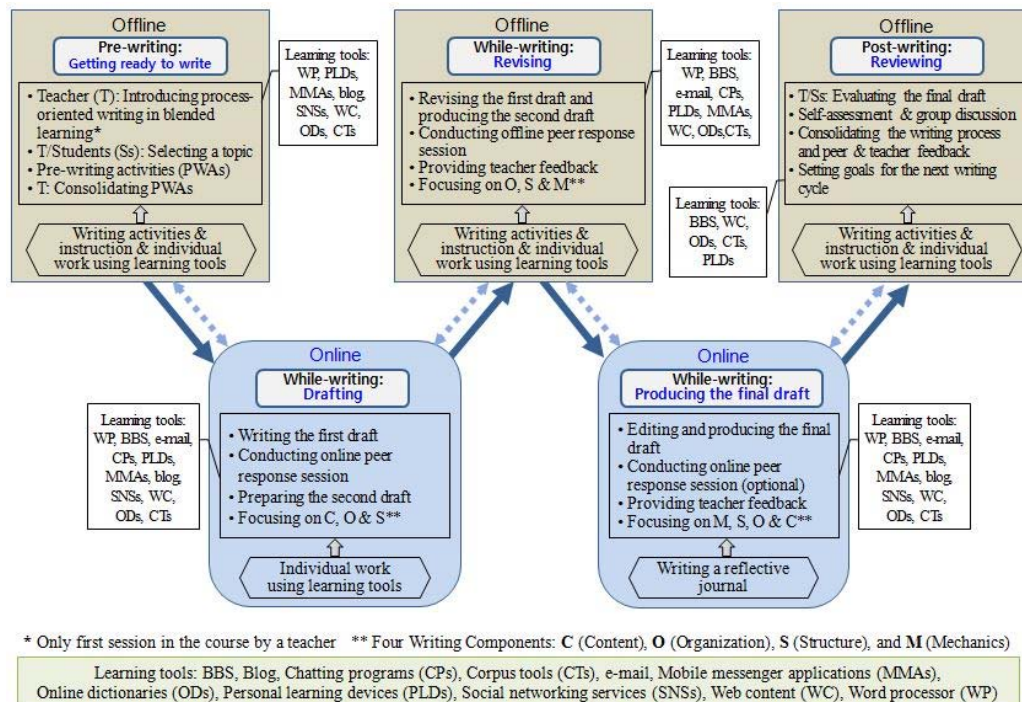
Figure 2: The instructional model for L2 writing in blended learning

CONCLUSIONS

This case study was conducted to investigate EFL pre-service teachers' perceptions toward a prototype of an instructional model for L2 writing in blended learning and its effectiveness on the development of L2 writing skills, and to develop a proper model of the instruction for L2 writing in blended learning. The main findings are as follows: First, the participants were found to receive the model positively. They considered it useful and helpful for the improvement of their writing skills; however, they found it somewhat difficult dealing with some of the tasks and activities provided in the model. Second, the model was found to be effective for the development of L2 writing skills. The model illustrates the writing process in five systematic stages and suggests a combination of writing activities based on the four writing components with varied learning materials and tools provided in online as well as offline environments. Due to the abundant opportunities to produce multiple drafts, the giving and receiving of feedback, and the explicit practicing of the four writing components, the participants were found to gain higher scores for the midterm and the post-test than the pre-test. Last, the prototype model for L2 writing in blended learning was modified by reducing the students' burden, intensifying the reviewing stage to reinforce further learning, and adding the learning tools for the promotion of interaction and communication among the students and the teacher.

For the effective and efficient implementation of this model for L2 writing classrooms, teachers need to carefully consider their students' learning environments and academic needs. This model is flexible enough to be modified according to the learning environment and academic need. For example, the writing process can be shortened to a one week cycle for advanced students. Writing activities on structure such as repairing sentence, sentence combining, and parallel writing can also be added for students who need extra help with accuracy. Regardless of the context, the need for adequate teacher training remains constant prior to the implementation of this model since it requires teachers to teach content, respond to students' writings, interact with students through varied learning tools, facilitate interaction, monitor students' writing process, and manage time efficiently. Teachers, therefore, need to be prepared to effectively employ this model for their students in terms of utilizing learning tools as well as addressing content.

Since this study was conducted as a case study, further research needs to be carried out with a large number of participants to provide a true experiment and investigation of its effectiveness. Furthermore, more studies need to be conducted with participants of other languages and varied proficiency levels to examine the impact of the model on the development of L2 writing skills.

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CAREER ADAPTABILITY AND INTENTION TO LEAVE AMONG ICT PROFESSIONALS: AN EXPLORATORY STUDY

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ABSTRACT
Adaptability was found to be one of the important aspects for employees in order for them to survive in their career especially to those in the ICT industry. The ICT work nature involved with consistent work changes, intensive creative thinking, and advanced technological upgrading. Although organizations supposed to encourage career adaptability among the employees, previous studies however showed that such encouragement contributed to the employees' turnover rather than retention. In order to generalize the previous findings into the Malaysian work context, this study explored whether career adaptability would have such influence on intention to leave the organization and the career. Findings of this study found that career concern, career control, career curiosity and career confidence were negatively correlated to both intentions to leave. However, only career control and career confidence were found to be significance in explaining the study model in multiple regression analyses. Implications of this study and recommendation for future studies were discussed.
Keywords: career adaptability, intention to leave, ICT professionals

INTRODUCTION
The uses of Information and Communication Technology (ICT) have been developed tremendously in order to assist the operations for daily business and education throughout the world. Technological advancements today have passed beyond cables and wires where the means of communication now can be done from just about anywhere. Office works can be done from home, meetings can be conducted virtually and educational classes can be handled from thousands of miles away without having to have the students to sit in front of their teachers in the same classrooms. However, there is a concern recently that such technological advancements would not be possible to be continued without the sufficient supplies of human capitals. They are the ICT professionals. Currently, it was found that the level of maturity for the ICT industry is not growing at the same rate with the number of the required available skill supplies (McLaughlin et al., 2012). To add, the retirement of the baby boomers in the ICT industry is making the risk of insufficient skill supplies to increase (Hecker, 2005). In Malaysia, the concern began with the issue of high turnover rates among the ICT professionals that continues to rise ("Malaysian Employers Federation," 2012) and the problem becomes more serious when these ICT professionals may also have the tendencies to leave the ICT career itself and work in a different set of career other than ICT (JobStreet.com, 2010).

Recent Malaysian employment statistics reported that the ICT industry was placed first in the list as the highest turnover rate between year 2011 to year 2012. The difference between the turnover rates of ICT as the highest in the list (75.72%) with the second highest is 43.32%. Such big gap required immediate attention for researchers to conduct such studies that can lead to lessen the turnover rate in the near future. On a similar note, the new generations seems to be not interested to take ICT as part of their career plan (MDec & Synovate, 2011). Therefore, in order to determine the current situations of turnover issues in ICT industry, the aspects of intention to leave among the ICT professionals were examined in this research. The assessments on intention to leave rather than the actual leaving were conducted because many evidence showed that intention is the immediate predictor to the actual behaviour (Fishbein & Azjen, 1975; Skinner, 1989; Stallworth, 2003).

It is also important to look at the potential antecedents that can contribute to reduce the level of intention to leave. Tracing back the work among ICT students, Der Vyver (2009) suggested that the students in ICT programs need to be adaptable in order for them to complete their study courses, and to enter and survive the ICT career successfully. In line with the theory in determining individual's decision to participate by March and Simon (1958), career adaptability represents the ease of movement that will influence the decision to leave. However, it was found previously that career adaptability will also encourage the intention to leave among the employees at the same time (Ito & Brotheridge, 2005). Although adaptability in career is very much needed among human capitals in the ICT field, it might also be one of the factors for job-hopping between

organizations. Therefore, this research's aims were to explore the various relationships between the constructs of career adaptability and intention to leave particularly among ICT professionals in Malaysia. Specifically, this research assessed whether career adaptability positively influence both intention to leave the organization and intention to leave the career, and whether the encouragement of career adaptability is healthy for organizations especially in ICT industry.

Although this research focusing on the industrial settings, the implications of this research are also relevant to the educational settings among the academicians. The issues of intention to leave among the ICT professionals in Malaysia are paramount to the studies both in academic and industrial setting. This is because the issues of human capital supplies in various industries began with the types of learning skills that nurtured the young students especially those in the higher educational institutes such as the colleges and the universities. The process continues with the pedagogy that prepared these students not just to pass the examinations but also to survive the employment world especially during the transitions process (from a graduate to an employee). In regards to ICT industry, the preparation for an individual to be adaptable in their career cannot be developed overnight. The skills need to be developed earlier during their studies in higher learning institutions. Thus, the findings of this research can assist the educational perspectives by planting the seeds of adaptability among the students in order for them to cope with the challenges in the career futures.

Career Adaptability

Career adaptability is defined as "the attitudes, competencies and behaviours that individuals use in fitting themselves to work that suits them" (Savickas, 2005, p. 45). Career adaptability is a plan for the unforeseen events that involves an individual undertaking in handling with changes (Rottinghaus, Day, & Borgen, 2005). It also deals with how an individual constructs a career which involves with the adjustment to vocational development tasks, occupational transitions, and personal traumas by solving problems that are usually unfamiliar, often ill-defined, and always complex. Originating from the work of Super (1980) of career maturity, career adaptability was introduced by Savickas (1997) where the adjustments made by him would be more suitable to be used among the working adults. Career maturity denote the fact that adolescents could peak at a level of maturity, as displayed in their career-related competencies and attitudes whereas career adaptability implies an ability that may either improve or deteriorate during the life span (Super & Knasel, 1981). In other words, an adolescent may become progressively more mature in terms of careers, whereas an adult may, due to psycho-social circumstances, be less or more adaptable during different stages in their careers (Hirschi, 2009). Adult career is characterised not only by the entry into, training for and working in an occupation, but it is much more also relates to the setbacks faced whilst working and the adaptability required to cope with the changing world circumstances (Savickas, 2005).

Career adaptability has been suggested as a key competency in career success generally (O'Connel, McNeely, & Hall, 2008) which enable individuals to effectively implement their self-concepts in occupational roles, thus creating their work lives and building their careers. Savickas (2005) developed a career construction theory's model of self-regulation for social and developmental with a set of specific attitudes, beliefs, and competencies which is known as the ABCs of career construction. These four syndromes of attitudes, beliefs, and competencies constitute career adaptability and represent resources for self-cultivation. The adaptive individual is conceptualized as (a) becoming *concerned* about the vocational future, (b) taking *control* of trying to prepare for one's vocational future, (c) displaying *curiosity* by exploring possible selves and future scenarios, and (d) strengthening the *confidence* to pursue one's aspirations (Savickas, 2005). Hence, the dimension for career adaptability is also known as the 4C's which are career concern, career control, career curiosity and career confidence.

Career concern involved with the individual views about the current career and how the future career will be like. It emphasizes preparation and planning for the career in the future (Creed, Fallon, & Hood, 2008). Career control is associated with the responsibility of a person to construct his/ her own career (Savickas, 2005). Individual with career control can decide on which job and career that should be taken based on his/ her own. Even though they can listen to other people's advice, the final decision will be made by the person's own decision. Career curiosity reflects the ability of a person to explore and finding information that are related to the development of the career (Savickas, 2005). People with high career curiosity normally will do large amount of research such as reading journals, brochures of training and development, asking expert advice and many more activities associated with developing the undertaking career. Finally, career confidence denotes the striving for success by encountering challenges and overcoming obstacles. The level of career confidence will determine the ability to solve problems related to work tasks.

The potential connection of the relationships between career adaptability and intention to leave was taken by the

work of Ito and Brotheridge (2005) and Der Vyver (2009) using the underlying theory by March and Simon (1958). The theory stated that individual need to consider the level of desire of movement and ease of movement in order to decide whether to stay or to leave an organization. Desire to move consists of commitment and satisfaction while the ease of movement was the availability of job market elsewhere (Anderson & Milkovich, 1980). The theory was then extended in recent work among IT professionals in Singapore where the antecedents for desire to move and ease of movement was modified to suits the current work situation (Joseph, Ng, Koh, & Ang, 2007). Career adaptability was inferred to influence job mobility (Trevor, 2001) and akin to flexibility (Wessel, Ryan, & Oswald, 2008) which contributed to the ease of movement for individual to leave the organizations. However, because there was previous evidence that stressed on the importance of adaptability in order to survive the ICT world, this relationship between career adaptability and intention to leave need to be further examined.

Intention to Leave
Intention has been recognized as the immediate predictor to actual behaviour (Sommer & Haug, 2010). Sheeran (2002) provided evidence that there is significant correlation between intention and behaviour. Hence, this study measured the intention to leave in order to determine the final outcome which is the real leaving. Although having intention to leave will not necessarily lead to actual leaving, the thought of leaving itself will affect organizational performances because it contributed to work inefficiencies, disengagement and absenteeism (Kivimaki et al., 2007).

The issues of intention to leave in ICT industry do not just occurred recently. It began since the early 2000s with the burst of dot-com bubble in the US. Although the salaries and benefits associated with this career continues to increase, the number of employee's leaving did not decrease (Rouse, 2001). This is also happening in Malaysia where the numbers of ICT graduates who continue working in the same field are now decreasing (Wong, 2010). Relative to that, the intention to leave assessment in this study divided into two aspects which are intention to leave the organization and intention to leave the career. This is to examined whether the current ICT professionals were intended to leave the ICT career. There are few types of turnover which are changing from unit to unit, organization to organization and finally the most severe case is leaving the current career for other career (Krausz, Koslowsky, Shalom, & Elyakim, 1995). Thus, it is timely to examine the current state of the ICT professionals whether they are having high or low intention to leave both their organization and the ICT career itself.

Previously, the relationship between career adaptability and intention to leave was tested and the relationships were positive (Ito & Brotheridge, 2005). This means that the increasing level of career adaptability will also increase the level of intention to leave. Although the relationship seems to encourage intention to leave, the study conducted by Ito and Brotheridge (2005) measured only on the aspects of intention to leave the organization. This study however extends the intention to leave aspects to leaving the career. As the key to survive in ICT field (Van Der Vyver, 2009) career adaptability in this study's perspective are expected to encourage individual to stay in ICT career. Thus, this constructs of career adaptability is relevant to be studied in determining the antecedents to lessen the turnover issues.

THE STUDY
This study used quantitative approach to generalize research findings among the ICT professionals in Malaysia. In order to explore whether there were relationships existed between career adaptability with both intention to leave the organization and the career, several tests were conducted such as the pearson correlation test, and the regression analyses. Two models were separately analyzed in regression analyses which are between career adaptability with intention to leave the organization and career adaptability with intention to leave the career. The method for analyses and findings of the study are discussed next.

Participants
The study samples were consisted of 303 of ICT professionals from Selangor and Kuala Lumpur from 15 different organizations. The sampling frame was taken from the lists of World Class Status listed by Multimedia Super Corridor (MSC). The sample frame was chosen because it provides the latest lists of ICT organizations in Malaysia that were highly adopting, developing, supplying and upgrading ICT technologies. The samples work nature ranging from and not limited to networking, software development, system technician and etc. There were 59% males and 41% females. 63% have bachelor degree18.6% have master degree and 1.7% obtained professional courses. There were 61.9% coming from Malay ethnic, 25.2% from Chinese ethnic, 11.3 % from Indian ethnic and 1.7% from other category of ethnic.

MEASURES

Career Adaptability

To measure the four C's of career adaptability (concern, control, curiosity and confidence), this study adopt the instruments from Savickas (2008). This instrument was chosen because it has been thoroughly studied by Savickas and his colleagues where the replications for different settings were done in various countries such as US, Europe and Australia. The questions required the respondents to select from scale 1 to 7 where 1 referring to 'very not strong' and 7 referring to 'strongest'. The result for the internal consistency (cronbach's slpha) for the constructs of career concern, career control, career curiosity and career confidence are .89, .89, .82, and .88 respectively.

Intention to Leave

The instruments used for intention to leave were taken from Alam and Mohammad (2010). There were three items which covering the aspects of searching, thought and intend. For example 'Presently, I am actively searching for other job'. The same instrument was used to measure intention to leave the organization and intention to leave the career. The words that referred to leaving the organization were modified in order to give meaning to leaving the career. For example 'Presently, I am actively searching for *other career than ICT*'. The instrument use 7-points scale where 1 represent 'strongly disagree' and 7 represent 'strongly agree'. The cronbach's alpha for intention to leave the organization is .88 while intention to leave the career is .92.

Analysis

The responses obtained from the respondents in measuring their intention to leave and career adaptability were analyzed using SPSS version 20. The data first analyzed by findings the means of each constructs in order to determine the level of the respondents' career adaptability and both intention to leave the organization and intention to leave the career. The data were then further analyzed for correlation and regression to test the relationships that might exist. Prior to the main analyses, the data set has passed the normality test and reliability test thus make the chosen assessment instruments relevant to be used in Malaysian work settings.

FINDINGS

Descriptive Statistics

The mean score for all variables are at moderate level. The respondents have higher intention to leave the organization (M=4.13; SD=.88) compares to intention to leave the career (M=3.53; SD= .85). This shows that the possibility of the ICT professionals to leave the organization is much higher than they are to leave the ICT career.

Career curiosity achieved the highest mean score (M=5.13; SD= .97) within the career adaptability constructs followed by career confidence (M=5.13; SD= .95). The ICT professionals are curious and have confidence in their career. The average mean score for career adaptability construct is 5.07 which indicated that these ICT professionals are moderately adaptable into their ICT career.

Table 1: Mean score for Intention to Leave and Career Adaptability

Dimensions	Mean	SD
Career Adaptability		
Career Concern	4.95	.87
Career Control	5.05	.97
Career Curiosity	5.14	.97
Career Confidence	5.13	.95
Average for Career Adaptability	*5.07*	
Intention to Leave Organization	4.13	.88
Intention to Leave Career	3.53	.85

Note: 1.00 – 3.99 = low; 4.00 – 4.99 = low-moderate; 5.00-5.99= moderate-high; 6.00 – 7.00 = high

Correlation

Correlation results shown in Table 2 stated that the relationships between the constructs of intention to leave and career adaptability were significant negatively related. All results were significant at .01 levels. In intention to leave the organization, it was highly correlated with career control (r= -. 478) followed by career confidence (r= -.466). The highest correlation between career adaptability constructs and intention to leave the career is for career confidence (r= -.447) followed by career control (r= -.427).

Table 2: Correlation results between the constructs of Career Adaptability and Intention to Leave

Variable	1	2	3	4	5	6
1. ITLO	1					
2. ITLC	.791**	1				
3. Career Concern	-.441**	-.381**	1			
4. Career Control	-.478**	-.427**	.739**	1		
5.Career Curiosity	-.432**	-.384**	.694**	.739**	1	
6.Career Confidence	-.466**	-.447**	.693**	.781**	.766**	1

**. Correlation is significant at the 0.01 level (2-tailed).
Note: ITLO= intention to leave the organization; ITLC= intention to leave the career

Coefficient for the predictor of variables
Using stepwise analysis, Table 3 showed the coefficient results for career adaptability and intention to leave the organization. In model 1, only career control is significant with the t-value at -9.430 (p < .001). The standardized Beta coefficients for career control and intention to leave the organization is -.478. The R square is .228 significant at .000 levels. This means that the proportion variance of intention to leave explain by 22.8% of career control. For model 2, career control (B= -.291; p < .001) and career confidence (B= -.239; p <.01) were significant with intention to leave the organization. Career concern and career curiosity were both removed from the model tested due to the insignificant results. The r square for model 2 is .250 (p < .01). This means that in model 2, 25% of intention to leave the organization was explained by career control and career confidence.

Table 3: Coefficient results for career adaptability and intention to leave the organization

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	**Std. Error**	**Beta**		
1	(Constant)	7.736	.390		19.850	.000
	Career Control	-.714	.076	-.478	-9.430	.000
2	(Constant)	8.200	.415		19.769	.000
	Career Control	-.435	.120	-.291	-3.638	.000
	Career Confidence	-.365	.122	-.239	-2.991	.003

The same analysis was carried for intention to leave the career. Referring to Table 4, only career confidence was significant with intention to leave the career (B= -.447; p <.001) with the t-value of -8.66. The r square for the first model is .20 significant at level .000. In the second model, career confidence (B= -.291; p < .001) and career control (B= -.200; p < .05) were found to be significant with intention to leave the career. The r square for the second model is .215 significant at .015. The second model showed that 21.5% of intention to leave the career was explained by career confidence and career control.

Table 4: Coefficient results for career adaptability and intention to leave the career

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	**Std. Error**	**Beta**		
1	(Constant)	7.082	.417		16.990	.000
	Career Confidence	-.692	.080	-.447	-8.666	.000
2	(Constant)	7.374	.430		17.135	.000
	Career Confidence	-.450	.127	-.291	-3.556	.000
	Career Control	-.303	.124	-.200	-2.442	.015

Regression

Table 5 showed the regressions analyses for model 1 and model 2 between career adaptability and intention to leave the organization. Both models were significant at level .000. The F value for model 1 is 88.9 while for model 2 is 50.11. The first model only consists of career control while model 2 consists of career control and career confidence. Career concern and career curiosity were both removed from both models.

Table 5: Regression analysis for career adaptability and intention to leave the organization

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	145.086	1	145.086	88.931	.000[b]
	Residual	491.064	301	1.631		
	Total	636.150	302			
2	Regression	159.307	2	79.653	50.113	.000[c]
	Residual	476.844	300	1.589		
	Total	636.150	302			
a. Dependent Variable: intention to leave the organization						
b. Predictors: (Constant), career control						
c. Predictors: (Constant), career control, career confidence						

Table 6 showed the regression results for career adaptability and intention to leave the career. Both models were significant at level .000. The first model only consists of career confidence while model 2 consists of career confidence and career control. Both career concern and career curiosity were removed from the models. The F value for the first model is 75.1 and model 2 is 41.14.

Table 6: Regression analysis for career adaptability and intention to leave the career

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	130.562	1	130.562	75.091	.000[b]
	Residual	523.355	301	1.739		
	Total	653.917	302			
2	Regression	140.761	2	70.380	41.146	.000[c]
	Residual	513.156	300	1.711		
	Total	653.917	302			
a. Dependent Variable: intention to leave the career						
b. Predictors: (Constant), career confidence						
c. Predictors: (Constant), career confidence, career control						

DISCUSSIONS

The results indicated that the relationships between career adaptability and intention to leave the organization and intention to leave the career do exist. In contrast with previous studies where career adaptability and intention to leave were positively correlated (Ito & Brotheridge, 2005), this research found that the relationships were significant and but negatively related. This means that having career adaptability will prevent the ICT professionals to have intention to leave for both the organization and the career. The research findings of this study can also be used in order to support previous research which found that students of ICT programs in higher learning required to be adaptable in order to cope with the study modules and as one of the tools to survive in the ICT field (Van Der Vyver, 2009). The existence of adaptability in career is just an extension of having adaptability in studying ICT courses. Perhaps due to the constant changes and the advanced and complicated technical upgrades required such individuals who venturing into this line of work to be able to cope with the turbulent work environments. The ICT industry also required individual to have critical thinking, creative work skills and expert in some tactical knowledge. Therefore, such adaptability skills need to be taught starting from the studies level in the higher learning institutes.

Although Ito and Brotheridge (2005) found career adaptability to be quite problematic for organization as it encourages job-hopping, this has only been tested in Canada among the federal civil services. Their study does not represent the ICT industry as a whole especially within the Malaysian work context. The differences in terms of cultural and individual personality aspects (Hofstede, 1984; Noordin, Williams, & Zimmer, 2002) can be some of the elements that might contributed to the difference results found in this current research. Thus, it is important to note such differences turn the views from organizations that have doubt to developed the organizational talent as it contributes to the departure of the employees to the views of having confidence to

developed such talents for the benefits of work performances and as well as employees' retentions. Findings of this study contribute to the body of knowledge where it entails that ICT organizations in Malaysia should encourage career adaptability without having the worries of employees' turnover. On similar note, the encouragement for the development of the adaptability skills can be implemented in the teaching and learning process among the students and the academicians without having to worry about job-hopping issues because being adaptable would not increase their leaving intention.

Even though all career adaptability constructs were significantly correlated with intention to leave the organization and the career, further tests in multiple regressions analyses showed that only career control and career confidence are able to significantly explain the intention to leave for both organization and career. Whereas, career concern and career curiosity were both found to be not significant to be included in the study models. Individual who has the sense of confidence in their career would also have the potential to have the control in determining the career directions that they are choosing. Individual with these attributes are able to adapt to constant changes in work environment and pre-prepared with uncertainty within work related in the organizations (Savickas, 2005). This will reduced the possibility to develop the intention of leaving the organization or the career such as giving up, loosing self-esteem, job dissatisfaction, work-conflicts, and work disengagement.

CONCLUSIONS

Findings of this research indicated that career adaptability appears to have influence on ICT professionals' intention to leave the organization and intention to leave the career. The higher career control and career confidence that the ICT professionals are having, the lower their intention to leave will be. Career adaptability that could lead to employees' retention is an area that is still underexplored, especially in the Malaysian work settings. An extension of this study in looking at the relationships between career adaptability with intention to leave aspects within the same ICT field or other industry through a qualitative method, or a blend of both qualitative and quantitative methods can be helpful in providing in-depth understanding of this issue. Thus, more focus should be emphasized on the career adaptability-variables involved, specifically in studying the employees' career retention. It is also suggested that adaptability should be tested among the students in higher learning institutes in regards to relating it to the level of the students' study engagement/participation. This is because the skills of career adaptability cannot be developed through overnight. The adaptability skills in career need to be consistently developed and it must start as early as in higher learning institutions. Thus, this study can be taken as the alarm for the academicians especially those related to ICT programs to include adaptability skills in their pedagogy strategy in order to produce future human capitals that are highly adaptable in their career and also with lower level of intention to leave both the organization and the career.

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DELIVERING EDUCATIONAL MULTIMEDIA CONTENTS THROUGH AN AUGMENTED REALITY APPLICATION: A CASE STUDY ON ITS IMPACT ON KNOWLEDGE ACQUISITION AND RETENTION

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ABSTRACT
This paper presents a study to analyze the use of augmented reality (AR) for delivering multimedia content to support the teaching and learning process of the digestive and circulatory systems at the primary school level, and its impact on knowledge retention. Our AR application combines oral explanations and 3D models and animations of anatomical structures. A validation study was conducted with fourth grade students in order to evaluate the effect of our tool on knowledge retention. In this study, we attempt to verify whether students using the AR application retained more concepts that those learning the topic in a traditional setting. Results show an increased knowledge retention on students using AR multimedia contents as opposed to those following a traditional course, which validates AR technology as a promising tool to improve students' motivation and interest, and to support the learning and teaching process in educational contexts.

INTRODUCTION
Nowadays, many educational institutions in developed countries are facing a lack of interest and motivation in students towards traditional academic practices. The growing distance between teaching procedures and the students' technological way of life contributes to widen the gap.

Up to the 19th century, formal education focused almost exclusively on lectures and recitations. Some early studies, however, explored the educational applications of manipulative interfaces. One of the first authors who studied what is commonly known as "hands-on learning" was Johann Heinrich Pestalozzi. He suggested that students learn best through their senses and through physical activity (Pestalozzi 1803).

Today, some authors continue researching in this field. For example, Resnick et al. (1998) promoted children's learning based on manipulative interfaces, and established the idea that physical objects might play an important role in the learning process. It is still a relatively new idea in the history of education. O'Malley and Stanton-Fraser (2004) discussed collaboration as a key factor for learning. Pontual and Price (2009) presented a motivational environment where students could learn the theory of light by experimenting with a tabletop with tangible elements. Other approximations can be found in the work of Fitzmaurice, Ishii and, Buxton (1995), Ishii and Ullmer (1997), and Ishii (2007), who proposed the use of tangible elements as tools to make interactions more natural and closer to the actions that take place in the real world.

Motivation must be seriously considered because it is directly linked to learning achievements. Therefore, augmented reality (AR) applications, which are interactively and visually richer than traditional media, seem more attractive and motivating than traditional tools (Shelton and Hedley, 2002), (Duarte, Cardoso, and Lamounier, 2005).

True learning requires experience. The more senses that are involved (sound, sight, touch, emotions, etc.), the more powerful the learning experience is. In this context, AR appears as an interesting emerging technology for education (Luckin and Fraser, 2011), (Lai and Hsu, 2011). AR combines real-time three-dimensional (3D) computer-generated models, video, and text superimposed onto real video-images. Several formal definitions and classifications for AR exist, including (Milgram, Kishino, 1994), (Milgram, Takemura, 1994). Azuma (1997) defined AR as a variation of virtual reality. Thus, AR supplements reality, rather than completely replacing it. With AR applications, it is possible to show the user a common space where virtual and real objects coexist in a seamless way. From a technological point of view, AR applications must fulfill the following three requirements (Azuma, 1997): combination of real and virtual worlds, real time interaction, and accurate 3D registration of virtual and real objects.

As Billinghurst (2002) stated, although AR technology is not new, its potential in education is just beginning to be explored (Sumadio and Rambli, 2010). Some examples of AR applications in education can be found in Woods et al. (2004), who showed the educational benefits of virtual and augmented reality technology, particularly how these technologies improve the interpretation of spatial, temporal, and contextual content (Tettegah, Taylor, Whang, Meinstninkas, and Chamot 2006). Comparative studies between AR and traditional

classes (Kerawalla, Luckin, Seljeflot, and Woolard, 2006), (Freitas and Campos, 2008) have confirmed that AR enhances students learning. Moreover, some authors have suggested that AR technology improves kinesthetic learning because students interact directly with the educational material, associating the content with body movements and sensations (Seo, Kim and Kim, 2006). Although slower, this kind of learning allows improving retention of acquired knowledge.

AR applications can be designed for different subjects and student levels. As an example, the Malaysian government recently created educational materials for a Road safety initiative, which included modules that combined mixed learning environments, interactive multimedia, AR and VR (Bakar, Zulkifli, and Mohamed, 2011). Other example is the work of Lin, Hsieh, Wang, Sie, and Chang (2011). In their project,the authors used AR and a touch-screen to enhance the educational resources about fish conservation in Taiwan. Their results focused on system usability, which was positive in an educational context. There are also a number of studies that explore the applications of AR technology to language learning. An interesting study was conducted by Ibáñez, Delgado, Leony, García, and Maroto (2011), where a multiuser AR platform for learning Spanish as a foreign language was developed. Results showed that AR has a positive effect on student motivation and improves the language learning process. Connolly, Stansfield, and Hainey (2011) developed an AR game for learning English as a foreign language to study how motivation could be improved through collaborative methods. 328 secondary school students and 95 language teachers from 17 European countries participated in this study. Most students and teachers were satisfied with the tools and expressed interest in learning other subjects using similar approaches.

Other AR tools such as Construct3D (Kaufmann and Schmalstieg, 2003), have been specifically designed for Mathematics and Geometry education at high school and university levels, encouraging students to experiment with geometric constructions. Construct3D was validated as a simple learning tool which contributed significantly to the improvement of spatial abilities and to maximize learning transfer.

VR and AR have also been used to provide an experience-based learning environment for understanding physics laws (Irawati, Hong, and Kim, 2008). In this system, simulation conditions were guaranteed via a 3D environment. Another AR application for Physics education was developed by Matsumoto, Miyauchi, Noguchi, and Yamashita (2012), where magnetic fields were visualized as realistic live magnetic distributions. Three-dimensional renders and other virtual objects were also used to augment real objects in Chemistry (Chen, 2006). Virtual systems are useful when a laboratory is not available or when the experiences are dangerous, expensive, or time-consuming.

Chen and Su (2011) conducted a study where elementary school children could learn to paint. The system used a sketch environment with computer vision and AR. Children could draw directly on the interface which provided additional functions such as contour extraction, image processing, and AR rendering. Results showed that the sketch system encouraged young children to participate and brought the natural painting experience to a virtual environment. The study opened up alternative opportunities for AR applications and tracking technologies. In a different study presented by Shamsuddin et al. (2010), Malaysian underwater habitats were simulated using AR. The virtual system provided similar educational value to students as that found in a real ocean, but time, cost, and manpower constraints were saved. As discussed in previous lines, AR in education has been used in every field of knowledge at every academic level, from kindergarten to college.

Some AR studies specifically encourage the concept of manipulation learning, such as the one presented by Seo et al. (2006), who referred to this type of learning as hands-on of experience. Additionally, several European Union funded projects such as CONNECT (CONNECT, 2011), CREATE (CREATE, 2011) and ARISE (ARiSE, 2011) have designed and developed AR applications that provide good examples to make certain concepts easier to learn.

In general, all the research mentioned previously evaluates students' results and system usability in order to show improvement in the learning processes. System usability is a key factor to provide a successful learning experience, especially when manipulation is a significant part of the work presented in this paper. To evaluate this topic, different surveys have been suggested (Dumas and Redish, 1999). Since the participants of our study are children, a Likert scale (Albaum, 1997) was selected as a suitable tool to evaluate the system usability.

This paper presents an AR system designed for fourth grade students to support the learning of the digestive and circulatory systems. Specific topics for the AR application were selected by a group of primary school teachers.

The results of a comparative study show a significant increase in knowledge retention in students that used the

AR system over the ones that attended traditional master classes. Participants were highly motivated and expressed interest in using the new technology in the classroom.

This paper is structured as follows: First, related work is presented. Next, a description of the system, interface design, and system architecture are introduced. Finally, the development procedure, validation protocol, results, and conclusions are discussed.

MATERIALS AND METHODS
Educational materials
The system is comprised of the three AR applications presented in the ICALT 2010 conference (Pérez-López et al., 2010), and a new module, which increases its functionality. The role of the teachers involved in the development of the system was to support the creation of the tool by selecting the most appropriate materials to show the students. The materials accurately portrayed the digestive and circulatory systems and provided added value to the educational experience with respect to other strategies such as the use of videos and real animal organs.

The system was organized into four applications because of the size of the 3D models used. The models are accessed by using a main menu with four buttons. The components and processes of the digestive and circulatory systems are explained in detail in each application. Different 3D models are rendered over the same AR marker and mixed with oral and textual explanations.

In the first application, a naked human figure is initially displayed. When the user moves the AR marker close to the camera, the body figure becomes semitransparent, making the digestive system visible, which allows the user to see the different organs in detail. In addition, different sections, zoom levels and transparency levels can be applied to reveal internal organs, as shown in Figures 1and 2.
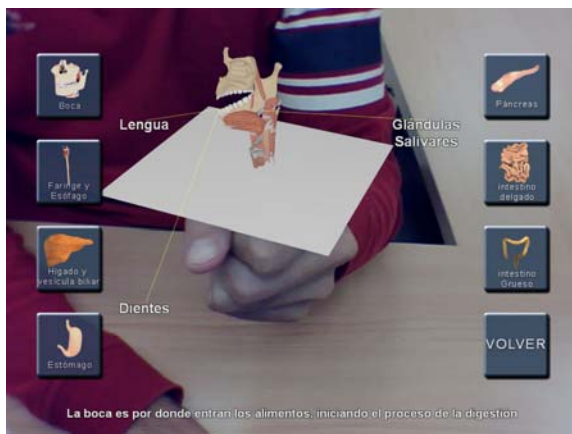
Figure 1: Digestive system: mouth detail.

Figure 2: Circulatory system: heart detail.

In the second application, the digestive process of eating a cookie is illustrated: from the initial bolus formation in the mouth until the elimination of waste products and undigested materials.

The third application is similar to the first one. In this case, the most important parts of the circulatory system are presented, as shown in Figure 3.

In the fourth application, detailed visualizations of the heart movements, systemic and pulmonary circulation are presented (see Figure 4). Animations of the blood flow through vessels and lungs are also included.
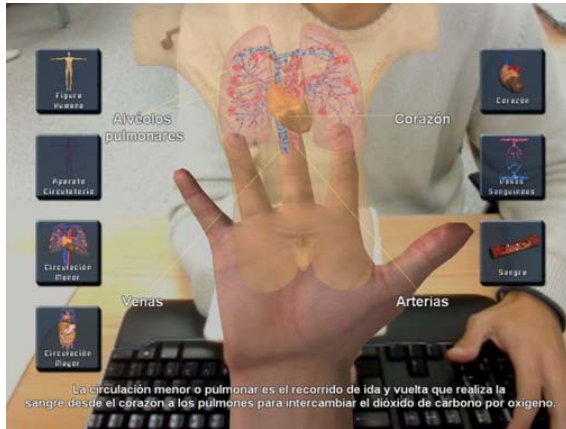
Figure 3: Pulmonary circulation animation.
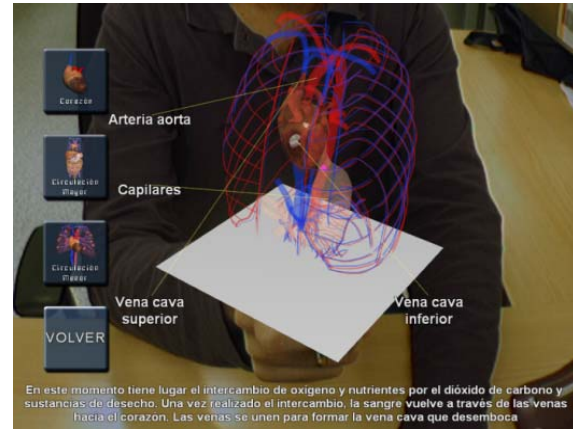
Figure 4: Systemic circulation model.

Interaction Design & Software Architecture

The interface of the applications is comprised of several buttons located at either side of the screen to allow the selection of different modules, as shown in Fig. 3. Selections can be made by using the computer mouse or the AR marker. Selections with the AR marker are achieved by matching the position of the AR marker on the screen with the position of the buttons, as shown in Figure 5.
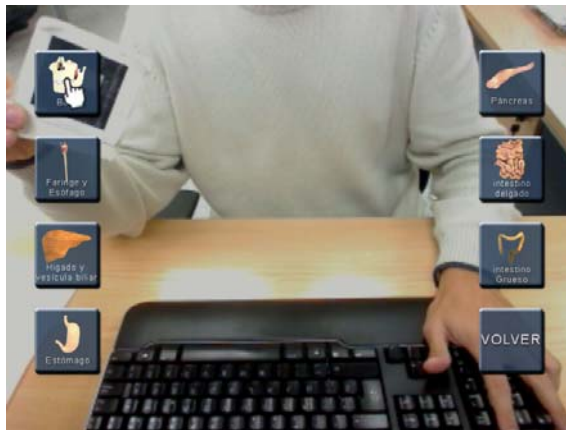
Figure 5: Menu interaction using markers.

Figure 6: System settings: user, screen, camera, marker, keyboard and mouse.

Click events are simulated by maintaining the AR marker over the button for two seconds. The application uses the live streaming video captured by a web camera as a background, as shown in Figure 6.

Additional interaction is provided by modifying the distance between the AR marker used to display the virtual objects and the webcam. A threshold is defined related to this distance which, when exceeded, triggers an event. This event is used to make the model transparent, show indicators with relevant names, or play audible and textual explanations over the model that is currently being shown (see Figure 7 and Figure 8). Both the transparency threshold and the model scale factor are configurable parameters. User preferences can be saved for future sessions.

Figure 7: Human body is shown when threshold is not reached.
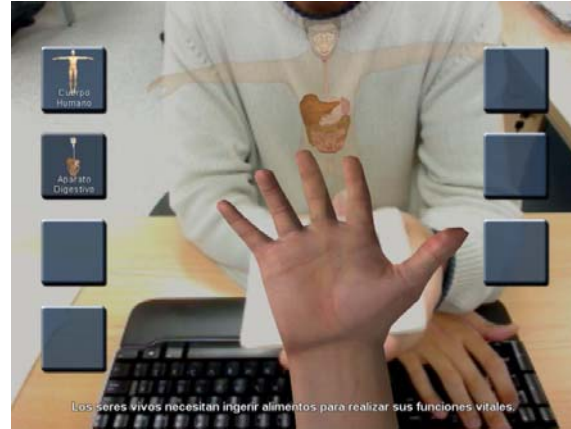
Figure 8: Human body becomes transparent exposing the digestive system when threshold is crossed.

The system was developed using the game engine Conitec Gamestudio Pro A7 and our in-house AR software library, HumanAR (Martín-Gutiérrez et al., 2010). The first provides all the necessary tools for creating 3D and 2D games and real time graphics applications whereas HumanAR overcomes some drawbacks that are present in some existing AR libraries (reduced jitter, adaptive threshold to avoid illumination variations, infra-red marker detection, etc.).

Validation Protocol

As part of this paper, we performed a pilot study to find out the suitability of the AR application as a teaching and learning tool. To evaluate this, the validation protocol described below was applied. On one hand, the impact of the tool on knowledge acquisition and retention was evaluated. On the other hand, the interest and motivation generated by the AR application was studied.

For our initial hypothesis, we stated that teaching using the AR tool provides a more effective learning experience than classical approaches based on anatomical illustrations and video sequences. If so, the performance and grades of the students using the AR tool should be higher than those using traditional learning methods. A preliminary study was conducted to analyze students' grades that were obtained in other educational units in the "Knowledge of the natural, social and cultural environment" course. This analysis showed an average grade of 8.41 with a standard deviation of 1.46, which makes it difficult to show a significant improvement in these students' performance (the Spanish grade system is based on a ten point scale, with 0 being the lowest and 10 the maximum grade). Therefore, we decided to evaluate the impact of the AR technology on knowledge retention (Kwon, Rasmussen, and Allen, 2005). Our new hypothesis states that the use of AR technology has a profound impact on students by, reinforcing the learned concepts. This means that after a certain period of time, students retain more concepts if AR contents were used during the learning process.

To demonstrate this hypothesis, a quasi-experimental design of nonequivalent control groups was selected (Albaum, 1997). Although two different groups of fourth grade students were involved in our study, the collaborating school did not allow an entire class to be a control group. Reasons include the fact that the school is private, where parents are particularly involved in many decisions related to their children´s education. In addition, we decided to give all children the opportunity to experience AR technology, especially after the school requested and financed part of the development.

Because of the previous limitation in the experimental design, an alternative validation scenario was selected. All fourth grade students participated as a unique group on the study (two classes), and knowledge retention was chosen as the subject of analysis. In order to compare the effect of knowledge retention on participating students, teachers selected two educational units of similar complexity at their discretion: "Digestive system" and "Changes in the last century". Both classes received one unit using the AR tool and the other unit was taught using traditional methods. The teachers remained unchanged for both educational units.

The "Digestive system" unit was taught by the teachers using the AR tool, and then a questionnaire to evaluate tool usability was administered to the students. Next, learning achievements were evaluated using standard procedures (a written exam). A second assessment was performed two weeks later, without previous notice, and

finally, a third one, also without previous notice, four weeks after the initial one. The same methodology was used to assess the unit "Changes in the last century", but in this case no AR contents were used.

Each educational unit is taught during six 45 minute sessions. Regarding the unit "Changes in the last century", sessions 1, 2 and 3 were taught in the classroom, with the teacher lecturing in a traditional way. Students complete a series of activities in the textbook during the remaining three sessions.

The dynamics of the "Digestive system" unit are as follows: the teacher presents the AR tool in session 1, i.e. how it works and how to use the AR markers. Each part of the digestive system is explained in detail using the AR tool. Session 2 is used to review the contents explained in the previous session, and to explain digestive processes using the animation tool. During session 3, previous contents are again reviewed, and students begin to use the AR tool individually. Finally, during sessions 4, 5 and 6, each student works in her own computer, performing the activities proposed by the unit, as shown in Figure 6. Motivation was measured by direct observation of children behavior and through a questionnaire.

RESULTS

39 fourth grade students of two different classes participated in the validation study during a period of two months. This group consisted of 19 girls and 20 boys, between 9 and 11 years old (mean 10.03 and standard deviation 0.54). They played the roles of an experimental group and a control group, depending on the lesson, at the same time.

Three traditional assessments for each lesson were proposed: the first one, as soon as lessons were taught; the second one, two weeks after the first assessment, without previous notice; and the third, four weeks after the first assessment, also without previous notice.

Student grades for every assessment were ranged from 0 to 10. Our initial assessment for both lessons consisted of 23 questions, mostly short answer (one or two lines). The final question required students to write fifteen or twenty lines. Student grades were analyzed to estimate improvements in the learning process. Assuming a normal distribution in the initial data, a paired sample t-test (t Student), with a 95% confidence interval ($\rho = 0.05$) was applied. Our alternative hypothesis states that the grades obtained with the learning unit that was taught using AR are better than the grades obtained with the learning unit that was taught traditionally. As a null hypothesis, the differences between these grades were random, with no statistically significant differences between them. The results are shown in Table 1.

Table 1: Initial assessment results

	AR learning, mean grade (std. dev.)	Traditional learning, mean grade (std. dev.)	t –Student ($\rho = 0.05$)	p-value
Initial assessment	6.34 (1.74)	6.31 (2.02)	0.11	0.916

As shown in Table 1, the p-value is not significant (p-value>0.05). As predicted, the analysis shows no statistically significant differences between the two methods during the initial assessment.

A second assessment for both lessons was performed two weeks after the initial one. This time, with seven questions similar to the questions presented in the previous assessment were used, six questions which could be answered in a couple of lines and a final question that required a longer answer. The second assessment was intended to be easier than the initial one. At this point, we presumed that the impact of the AR technology would be noticeable. The same analysis with the same hypothesis was applied. The results are shown in Table 2.

In this case, the p-value is significant (p-value<0.05), so the analysis shows statistically significant evidence that indicate that the grades obtained in the learning unit that was taught using AR are better than the ones obtained in the unit that was taught using traditional methods two weeks after the initial assessment. In addition, the effect size d was calculated to estimate the extent up to which the null hypothesis is false (Cohen, 1998). A value of 0.86 was obtained, which has a big effect according to Cohen (1998), (0.2 indicates a small effect; 0.5, a moderate effect; and 0.8, a big effect).

Table 2: Retention assessment after two weeks

	AR learning, mean grade (std. dev.)	Traditional learning, mean grade (std. dev.)	t –Student ($\rho = 0.05$)	p-value	Effect size d
Assessment after two weeks	6.77 (2.21)	4.89 (2.14)	6.17	0.000	0.86

Finally, a third assessment was performed four weeks after the initial one for both learning units. Both of them consisted of twenty five true-false questions and a final long question where the student had to write her answer in fifteen or twenty lines. As the previous assessment, the impact of the AR technology should be noticeable, so again, the same analysis was performed. The new results are shown in Table 3.

Table 3: Retention assessment after four weeks

	AR learning, mean grade (std. dev.)	Traditional learning, mean grade (std. dev.)	t –Student ($\rho = 0.05$)	p-value	Effect size d
Assessment after four weeks	6.66 (2.26)	5.48 (1.93)	3.28	0.002	0.56

Once again, this new analysis provides a significant p-value. There are significant evidences that indicate that the grades obtained in the learning unit that was taught using AR are better than the grades obtained in the unit that was taught using traditional methods four weeks after the initial assessment. In this case, the effect size has a value of 0.56, which indicates a moderate effect according to Cohen (1998).

Our study has demonstrated that knowledge retention increases if the content is delivered using AR. Additionally system usability and user motivation were also evaluated. The questionnaire shown in Table 4 was used. The questions were divided into two groups: the first five questions assess the class development using AR, and the next five questions evaluate AR as a tool. A five level Likert scale (Albaum, 1997) was used (1-strongly disagree, 5-strongly agree).

Table 4: Class and tool evaluation questionnaire

Index	Question
1	I paid more attention in this class than any others
2	This class has been useful and interesting
3	I would like to take more classes like this
4	It is easier to follow the teacher's explanation in this type of classes
5	I behaved better in today's class than I did in other classes
6	I prefer the classic book over the new materials
7	It was easy for me to move the human models over the AR markers
8	I believe this material will help me pass the exam
9	This material has been easy to learn and use
10	I would like to use this material at home

The responses to the questionnaire are illustrated in Figure 9. The figure contains ten radial straights and five concentric figures. Each radial straight represents a question and each concentric figure represents possible values for the answers. Thus, analyzing questions 1 to 5, students show a considerable interest and attention in this class. Question 4 is especially interesting, as students claim that the lesson is easier to follow when taught with this new tool. Question 5 indicates that, compared the other classes, students admit to behave better during the lessons taught with the AR technology.
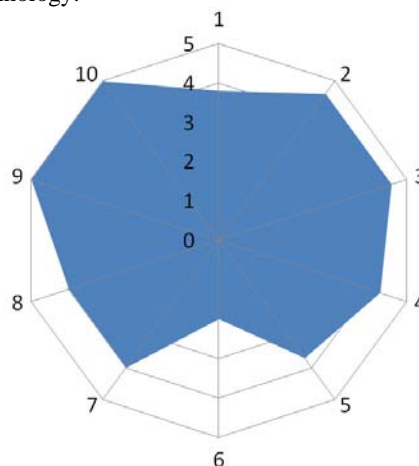
Figure 9: System usability and user motivation results.

With regard to questions 6 to 11, the results show that the majority of students prefer to use AR technology. It

should be noted that question 6 was presented in an inverted way to ensure that students were paying attention when filling the questionnaire. Therefore, this question presents low values. In addition, although no students had prior training with the tool, they find it easy to use, as evidenced by questions 7 and 9. Question 8 shows that students recognize the effectiveness of the tool to improve their performance. Finally, question 10 shows that students would like to use the tool at home.

Teachers' observations during classes confirmed the results obtained with the questionnaires. They noticed that the students behaved better than usual, they stayed quiet and focused in the AR application. Curiosity was a driving factor towards motivation. In this sense, the children spent all class time exploring additional possibilities of the application.

CONCLUSIONS

The use of our AR system provides several benefits over traditional teaching methods. One of the most important advantages is the stimulation of several sensory modalities: touch, sight and hearing. As a consequence, it makes students actively involved in the learning process. With traditional teaching techniques, students only receive information by one sense at a time. For example, a book can provide 2D illustrations and text, but students are only able to notice one of these stimuli at a given time.

3D models can be manipulated and seen from all angles, and users do not have to read all the text since the system provides audible explanations. It is reasonable to think that video can provide similar advantages; however, with video, users have to wait for the instant when the desired body part is shown. With the AR system presented in this paper, users have the additional benefit of manipulating models to the desired viewpoint at any given time, which provides total control over their learning experience.

The learning obtained by practicing with real animal organs can be compared to the learning achieved with our system. Although manipulating dissected organs provides a perfect knowledge of the anatomy, it depends on the student's skills to see and touch viscera. On the other hand, it is not possible to reproduce processes that happen when the body is alive and the logistics for such experiences are not always easy to face. With our AR system, the positive aspects of manipulating organs remain without its disadvantages.

In the specific context of the primary school level, AR-based teaching and learning has proven to be more effective than standard approaches with respect to knowledge retention. We consider this a first step that can open the door to future, more extensive validation studies with the purpose of analyzing the impact of AR technology on teaching and learning processes.

Regarding the system usability, students prefer to use this new tool instead of traditional teaching materials. They have also shown considerable interest in this new type of learning. We noticed that students learned to interact with the system fast, perhaps due to the eye-hand coordination.

We intend to conduct more extensive studies to validate the whole system (a quasi-experimental cohort design is under preparation) and to validate other AR contents developed for fifth grade students, and confirm the preliminary results presented in this paper.

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DEVELOP AND EVALUATE THE EFFECTS OF MULTIMODAL PRESENTATION SYSTEM ON ELEMENTARY ESL STUDENTS

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ABSTRACT

The purpose of this study is to develop and evaluate the effects of multimodal presentation system (MPS), a multimodal presentation software integrated with interactive whiteboard (IWB), on student learning in the elementary English as second language (ESL) course. It focuses primarily on techniques and tools to enhance the students' ESL learning achievement and learning satisfaction in the classroom setting. This paper utilizes the MPS, based on Mayer's cognitive theory of multimedia learning (CTML), to present the multimedia instructional materials in auditory and visual modalities. This learner-centered instruction was compared with a traditional teacher-centered English teaching using blackboard. An experimental research design was employed and 134 fifth-graders were involved in this study. Evaluation of the instruction was based upon data from test scores and questionnaire related to students' learning satisfaction. In addition, semi-structured individual interviews were conducted with randomly selected participants from experimental group to express their perspectives on the merit of using the MPS. The results revealed that there were statistically significant differences between the students in experimental group and control group on measures of learning effectiveness. More details of the results and implications are also discussed in the study.

Keywords: Interactive Whiteboard, Multimedia, Multimodal, English Learning, Storytelling

INTRODUCTION

The purpose of this study is twofold. First, this study develops a multimodal presentation system (MPS), a multimodal presentation software integrated with interactive whiteboard (IWB), to support the classroom learning in the elementary English as second language (ESL) course. Second, this study evaluates the effects of MPS on student learning achievement and learning satisfaction in the classroom setting.

English is regarded as a second language in Taiwan. Teachers usually present text-centered materials with little pictures on blackboards and the students read directly following the teachers. This blackboard teaching provides an inflexible presentation of teaching materials in the way of colors, styles, as well as multimedia formats. The language learning process is a complicated, intelligible and meaningful activity. Krashen (1982) claimed that second language acquisition was an implicit process. Regardless of learning context, all learners must ultimately create an implicit linguistic system in order to be successful language learners and users (Ellis, 1994; Krashen, 1982; VanPatten, 2003). Students are unable to effectively internalize language as parts of the cognitive system via mechanical exercises and repetitive operations (Lightbown, 2003). According to Mayer's (2001) cognitive theory of multimedia learning (CTML), learning from distinct channels leads to a general improvement in learning. Also, the modality principle of multimedia learning (Mayer, 2001) suggests that students learn better when words in a multimedia message are presented as spoken text rather than printed text. Since the last 20 years, e-learning has become a modern teaching method in using information technology within the classrooms. The e-learning includes all forms of electronically supported learning and teaching, by taking advantage of computer technologies and software, to enrich and improve the teaching and learning quality (Hussein, 2011). Recently, information technology has enabled an explosion in the availability of visual ways of presenting materials. Large amount of multimedia English learning materials and computer assisted language learning software have been developed to enhance the learning performance of English pronunciation, spelling, phonics, and word attack skills (Beatty, 2010; Lee et al., 2005; Towndrow, 2007). Therefore, many English teachers have started to make use of technological tools to present teaching materials in multimedia formats.

Recently, interactive whiteboard (IWB) has been used to replace the traditional blackboard in the classroom. It

provides medium to display teaching materials including files, educational software, web sites, and others for providing powerful multimedia/multimodal presentation (Ekhami, 2002; Isman et al., 2012; Jang, 2010; Smith et al., 2005; Türel & Johnson, 2012). In educational research discourse the term 'interactive' concerns with pedagogy and new technologies in education. Beauchamp & Kennewell (2010) claimed that interactive teaching towards a more student-centered approach will be valuable and there is potential for technology to support more dialogic and synergistic approaches in group and individual activity. Glover et al. (2005) demonstrated that there is a progression at all levels in learning for using the IWB and associated software. Smith et al. (2005) reviewed the literature and claimed that the literature preponderantly endorse the positive impact and potential of IWB, based on the views of teachers and students. Accordingly, using IWB brings the change of linking technology and pedagogy in the classroom (Beauchamp & Kennewell 2010; Glover et al., 2005; Smith et al., 2005).

Many studies related to the use of IWB in educational settings have shown that IWB technology can promote teacher-student interaction and student participation in classroom (Higgins et al., 2007; Kennewell et al., 2008; Schmid, 2008, 2010; Smith et al., 2005). For example, Smith et al. (2005) claimed that the pedagogical potential of IWB technology is to provide higher level of interactivity and participation over traditional blackboard. Also, some research on IWB prove the positive improvement of learning achievement (Digregorio & Sobel-Lojeski, 2009; Jang, 2010; Lewin et al., 2008; Slay et al., 2008; Thompson & Flecknoe, 2003). Although the aforementioned positive effect of IWB, there are some controversial point of view about IWB use. For example, Coyle et al. (2010) analyzed the influence of IWB technology on the language use of a primary school and revealed that the failure to promote verbal interaction for the group of non-native speaker (NNS) in an English language immersion classroom. In addition, in the claim of interaction improvement, many teachers tend to dominate the IWB lesson without inviting the students to interact with the board themselves (Levy, 2002).

Storytelling by adults is considered as a critical step that can facilitate comprehension and increase interest in teaching (Smith, 1988). Especially for language learning, storytelling is a practical and powerful teaching tool (Tsou et al., 2006). Chien and Huang (2000) claimed that predictable storybooks are effective in building ESL kindergarteners' oral and literacy development. Recently, storytelling as a way of teaching children English has been flourishing in Taiwan (Lee, 2012). In addition, researchers have demonstrated successful usages of computer assisted English learning in significantly facilitating teacher's storytelling and children's learning in ESL classrooms (Lee, 2012; Tsou et al., 2006). However, to the best of our knowledge, research of exploring the effectiveness of IWB in English vocabulary learning through storytelling teaching method is rare, and therefore this has become an important issue of research.

As a result, this study develops a multimodal presentation system (MPS) to present multimedia instructional materials and manage interactive learning activities in the classroom. More specifically, the MPS is used to support the verbal instruction materials (e.g., printed words, spoken words) and the corresponding visual instruction materials (e.g., illustrations, photos, video, and animation) in the interactive instructional activity. In addition, learning achievement and satisfaction are the major objectives of learning activities (Long, 1985; Lu et al., 2003), this study thus to explore the learning achievement and satisfaction of English learning activity by use of the MPS.

The remainder of this paper is organized as follows. Section 2 reviews pertinent literature on the research of Mayer's cognitive theory of multimedia learning (CTML) and learning effectiveness. Section 3 then describes the architecture of the multimodal presentation system (MPS) and section 4 presents the experimental design and process. Section 5 presents the experimental results, as well as discussion on the findings. Finally, Section 6 addresses conclusions, limitations and directions for future research.

LITERATURE REVIEW
Mayer's cognitive theory of multimedia learning (CTML)
Multimedia is defined as the presentation of materials using both words and pictures and thus focused on the auditory/verbal channel and visual/pictorial channel (Mayer, 2001, 2003, 2005). Mayer (2001, 2003, 2005) presents a theory of multimedia learning in terms of an information-processing model, called cognitive theory of multimedia learning (CTML), by integrating Sweller's cognitive load theory (Chandler & Sweller, 1991; Sweller, 1988), Paivio's dual-coding theory (Clark & Paivio, 1991; Paivio, 1986), and Baddeley's working memory model (Baddeley, 1986, 1993, 1999).

The CTML provides empirical guidelines to promote instructional design to achieve meaningful learning (Mayer, 2001). Based on three main assumptions (dual channel, limited capacity, and active processing), seven principles (multimedia principle, spatial contiguity principle, temporal contiguity principle, coherence principle, modality principle, redundancy principle, and individual differences principle) are proposed in this theory. The modality principle suggests that as textual information, presented in an auditory mode, with concurrent visuals

are displayed, students have greater knowledge acquisition (Ginns, 2005; Mayer, 2009). The visual information processing channel may become overloaded when students must process on-screen graphics and on-screen text at the same time. Van Someren et al. (1998) suggested that the educational representations should be developed to utilize this multimodality approach to allow learners to learn by exploring and linking different modalities. Also, some literatures show supporting evidence that presenting information in auditory mode with concurrent visual mode leads to deeper understanding (Mayer, 2003; Mayer & Sims, 1994; Paivio et al., 1998).

Learning effectiveness

In general, learning effectiveness can be measured using two variables: academic achievement (e.g., semester grade, test score) (Alavi et al., 1995; Shih et al., 2012) and learning satisfaction (Knowles, 1970; Maki et al., 2000; Piccoli et al., 2001). Correspondingly, the study of Huang et al. (2012) took academic achievement and learning satisfaction as two criteria for measuring student's learning effectiveness. Learning satisfaction can be regarded as the learners' feeling (Long, 1985; Tough, 1982), the learners' attitude (Long, 1985), or the learners' sense of pleasure (Johnson et al., 2000) toward their learning activities. Piccoli et al. (2001) and Maki et al. (2000) believed that learning satisfaction expresses learners' satisfaction derived from the learning process and learning results. Hence, learning satisfaction is a very suitable criterion for assessing learners' satisfaction with classroom learning. In summary, we can obtain better understanding of a student's learning effectiveness according to both academic achievement and learning satisfaction. As a result, academic achievement and learning satisfaction are considered as two important criteria for measuring student's learning effectiveness in this study.

THE ARCHITECTURE OF THE MULTIMODAL PRESENTATION SYSTEM (MPS)

In multimodal learning environments, students are presented content knowledge with a verbal representation and one or more corresponding visual representations. According to the modality principle of instructional design, learning outcomes will be optimized by presenting the verbal and visual representations of the knowledge in auditory and visual modalities (Moreno & Mayer, 2007). An interactive multimodal learning environment is the one in which the presented words and pictures depend on the learner's actions and the communication is multidirectional during learning. Figure 1 shows the architecture of the multimodal presentation system (MPS). The MPS in the environment consists of four primary components, which are Office Card Component, Media Card Component, Annotation Card Component, and Manager Card Component. This multimodal presentation software was designed to bring students to the interactive whiteboard, more directly involving them in the lesson.
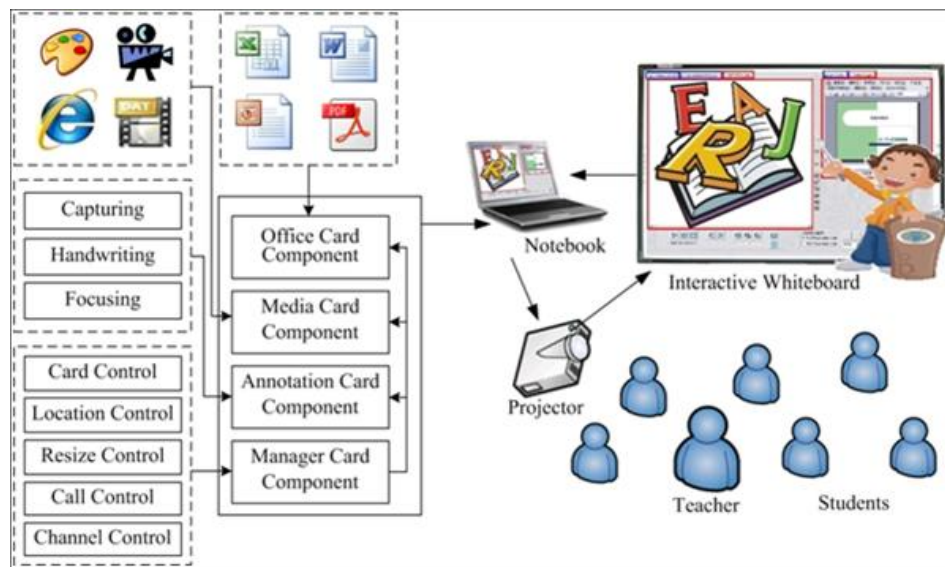
Figure 1: The architecture of the multimodal presentation system (MPS)

Office Card Component is used to manage software applications simultaneously, especially for Microsoft Word, Excel, and PowerPoint software. Normally, for multiple PowerPoint presentations there is only one PowerPoint application can be activated at the same time. By using the functions provided by Microsoft OLE and COM Automations, Office Card Component is able to support the control of document, such as page up, page down, page jump, and change the view of document, etc.

Media Card Component is used to manage media object containers. For example, Digital Video is used to connect video devices and audio devices to display and record as a real-time streaming. Media Player Control provides scroll bar with play, stop, pause, etc. Browser Control and Image Control provides users with connecting Internet and image objects, respectively.

Annotation Card Component supports three major functions. Capturing is used to record screen operations and sounds into video movie files. Handwriting is used to support teacher's lecturing handwriting with notebook without electromagnetic digitizer. Focusing is used to emphasize the teaching materials by changing the background or frame color of the object containers.

Manager Card Component is used to manage authoring and presenting containers of materials. It includes five major control functions. Card Control is used to create, add, copy, rename, and delete the object containers. Location Control is used to move, switch, and arrange the location of object container. Resize Control is used to change the size of object container. Call Control can create the relation between related materials such as the major container and the child containers. It can record the numbers of object containers, show the previous pages of containers, and call the containers back to the primary monitor. Channel Control is used to present the object container to different monitors. Teachers can present instructional content in one or more columns scenario.

RESEARCH DESIGN
Procedures
One purpose of this study is to evaluate the elementary student learning achievement and satisfaction within classroom English vocabulary acquisition by utilizing the multimodal presentation system (MPS). At the end of the learning students took a post-test for measuring the learning achievement and questionnaires for measuring the learning satisfaction. Owing to the fact that questionnaires and interviews are often used together in studies investigating educational assessment (e.g., Brookhart & Durkin, 2003; Lai & Waltman, 2008), semi-structured individual interviews were also conducted with randomly selected participants from the experimental group in this study. In compliance with the assertion of Kendall (2008), the qualitative interview data are helpful in gathering more in-depth insights on participant attitudes, thoughts, and actions. Procedures of the experiment are shown in Figure 2 and the details are described as follows.
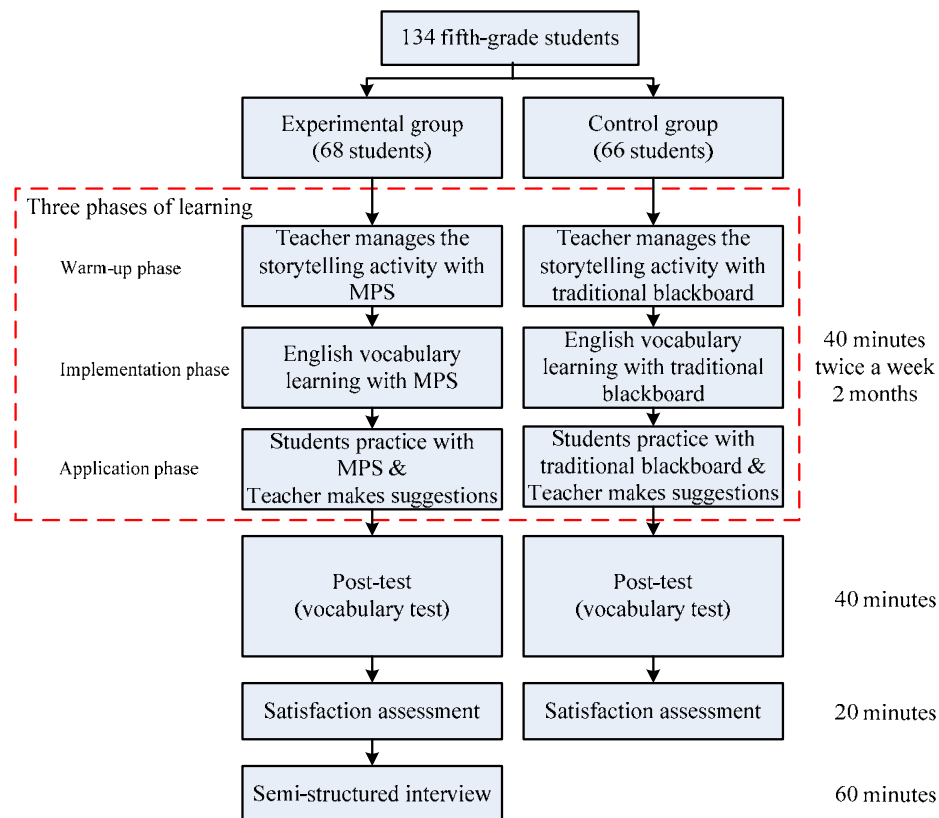
Figure 2: The experimental procedures

Participants

The participants were 134 pupils (72 boys and 62 girls) from six classes of two public elementary schools in Taiwan. All subjects, ranging in age from 11 to 12, were fifth-grade students. The instructional approaches were assigned randomly to six classes. The experimental group (68 students, 37 boys and 31 girls) was lectured with MPS and the control group (66 students, 35 boys and 31 girls) was lectured with blackboard. A summary table describing the distribution of participants is shown in Table 1. The experiment was held in the "English as a second language" course and lasted for two months from mid-March 2011 to mid-May 2011. Lectures were given twice a week, and each was taught for 40 minutes. Both groups were taught with the same learning materials by the same teacher. Although this type of experimental design is not completely followed by a randomized selection and assignment, it is often necessary in educational settings because intact classes are already constructed before the research is begun.

Table 1: The distribution of participants

Groups	Boy	Girl	Total
Experimental group	37	31	68
Control group	35	31	66
	72	62	134

Three phases of learning

Step 1: The warm-up phase

Both groups were taught with the same story but provided with different tools for presenting the contents. In the learning setting of experimental group, the teacher presented the story in video media form with Media Player to guide the thinking of students about the learning vocabularies. Figure 3 shows the authoring mode, used by the teacher for preparing the materials with multimodal presentations, of MPS. Figure 4 shows the scenario of video playing with the MPS in the warm-up phase. In contrast, the teacher managed the storytelling and drew the learning contents on the blackboard in the learning setting of control group.

Figure 3: The authoring mode of the MPS
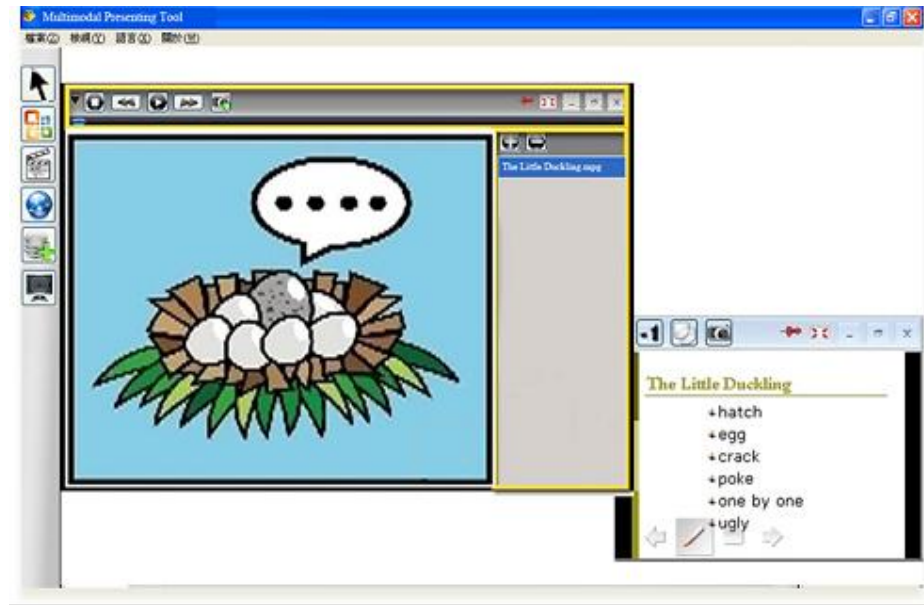
Figure 4: The video playing with the MPS in the warm-up phase

Step 2: The implementation phase
Both groups were taught with the same English vocabularies but provided with different tools for presenting the contents. In the learning setting of experimental group, the teacher presented the learning vocabularies and video media materials with the MPS. Also, while the teacher instructed, the whole teaching process on the IWB was recorded. This offered the students a chance to play back the recordings for refreshing their previous learning or inducing reflective learning. Figure 5 shows the scenario of vocabulary teaching with the MPS in the implementation phase.
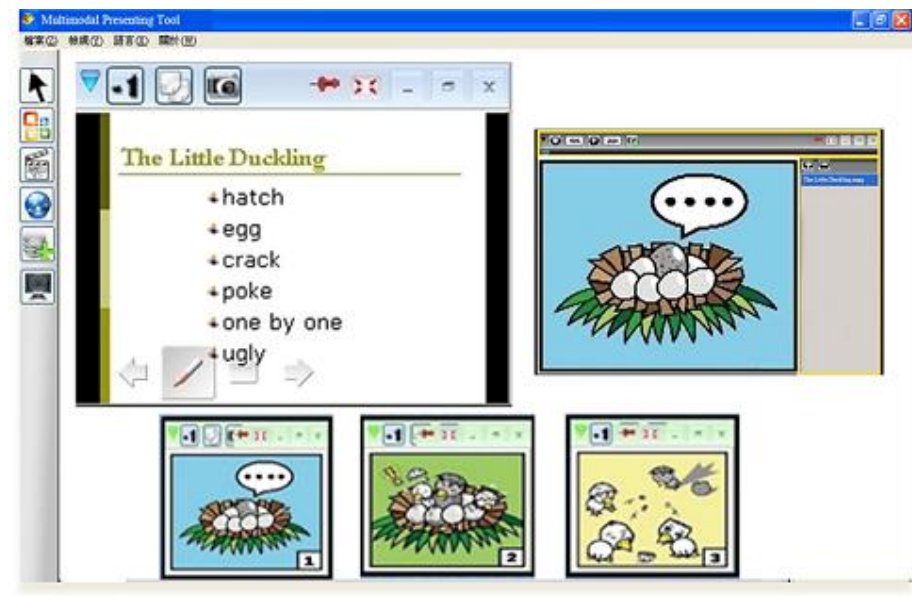
Figure 5: The vocabulary teaching with the MPS in the implementation phase

Step 3: The application phase
In the learning environment of experimental group, as shown in Figure 6, the learning contents including text, videos and graphs were presented on the IWB. The MPS provided convenient ways for students to practice or discuss through pictures or videos. For example, the students could use the MPS to review the unfamiliar vocabularies, pictures, or videos that have been recorded. The teacher was required to make comments or suggestions while students were practicing or implementing. For example, if the students were ever in doubt, they could enquire the teacher about how the new knowledge is related to other course materials.
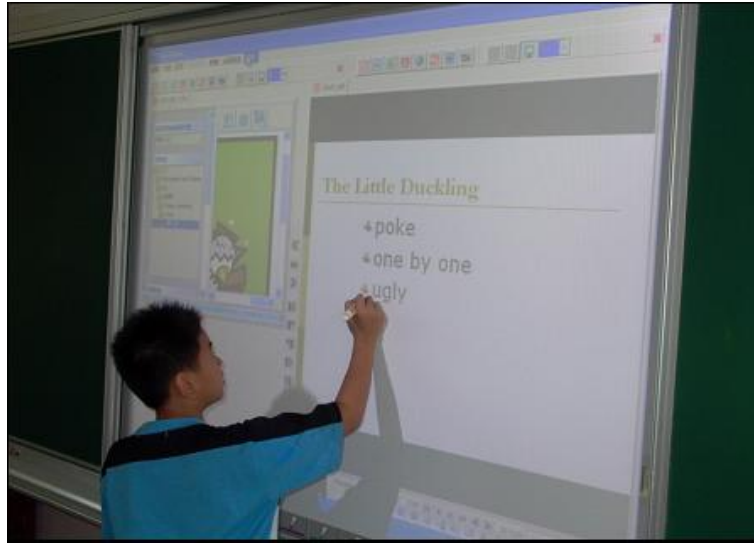
Figure 6: The students managed the MPS for vocabulary learning

Post-test
At the end of the three phases of learning the students took a post-study written test of the vocabularies taught. The test score is used as the objective measurement of academic achievement, one of the criteria for measuring student's learning effectiveness in this study.

Satisfaction assessment
At the end of the post-test the students completed a self-questionnaire with regard to the learning satisfaction. A questionnaire, as shown in Table 2, was employed to understand the students' learning satisfaction. Particularly, our assessment of learning satisfaction is based on the questions proposed by Hui et al. (2008), with additional translations into Traditional Chinese to tailor the questionnaire to Taiwanese students in this study. Two professors were asked to pretest the questionnaire in order to ensure its clarity. Their feedback was incorporated into the final version. This questionnaire was composed of 6 items and each item was measured on a 7-point Likert scale where 7 indicated a strong preference and 1 indicated a weak preference for student's satisfaction. Internal consistency reliability, as represented by Cronbach's alpha, was 0.82, revealing an acceptable level of reliability (Chin, 1998).

Semi-structured Interview
At the end of the satisfaction assessment semi-structured individual interviews were conducted with 11 randomly selected participants from the experimental group. Finally, the results of this interview have been recorded in details.

RESULTS AND DISCUSSION
A t-test is used to test the null hypothesis that the population mean in each of the two groups is equal (Hair et al., 2010). Given the need to measure the differences between the experimental group and the control group in this study, regarding to the learning achievement and satisfaction, the independent samples t-tests were carried out. In addition, semi-structured individual interview data of some randomly selected participants from the experimental group were collected for building a better understanding of the students' user experience.

Learning achievement
Table 2 shows the statistical results of the experimental group and the control group on measuring the post-test scores concerning learning achievement. The mean of scores was 79.78 (SD = 11.13) for the experimental group, higher than the 76.20 (SD = 8.61) for the control group. There is a significant difference between these two groups, $t(125.794) = 2.087$, $p < .05$.

Table 2: *t* test result of the test scores

	Groups	*N*	*Mean*	*SD*	*df*	*t*	*p*
score	Experimental group	68	79.78	11.13	125.794	2.087*	.039
	Control group	66	76.20	8.61			

*$p < .05$

The empirical analysis results reveal that the students who used the multimodal presentation system (MPS), a multimodal presentation software integrated with interactive whiteboard (IWB), obtained a better result on average, implying that the system is able to lead students to significantly better learning achievement in English vocabulary learning, and is therefore useful. Previous studies of IWB (Digregorio & Sobel-Lojeski, 2009; Jang, 2010; Lewin et al., 2008; Slay et al., 2008; Thompson & Flecknoe, 2003) proved the positive improvement in developing the learners' learning achievement. The study of Lopez (2010) also indicated that a digital learning classroom project, using interactive whiteboard (IWB) technology, contributed to increase the English language learners' achievement, compared to those in traditional classrooms without IWB technology, in 3rd grade mathematics and 5th grade mathematics and reading.

Student satisfaction

Table 3 shows the statistical results of the experimental group and the control group on measuring the 6 survey items related to the learning satisfaction. The mean of overall satisfaction was 35.90 (SD = 4.91) for the experimental group, higher than the 25.91 (SD = 3.91) for the control group. There is a significant difference between these two groups, $t(127.120) = 13.049$, $p < .001$.

Table 3: Means (*M*), standard deviation (*SD*), and *t* value for learning satisfaction

Items	Experimental		Control		df	t	p
	M	*SD*	*M*	*SD*			
I like the idea of learning English in a class like this; i.e. the one I have this semester.	4.78	1.38	3.62	1.03	124.113	5.507***	.000
Learning English by taking a course like this is a good idea.	5.56	1.20	4.41	0.99	128.704	6.047***	.000
My learning experience in this course is positive.	5.07	1.11	2.42	0.91	132	15.063***	.000
Overall, I am satisfied with the course.	5.03	0.85	4.21	0.95	132	5.254***	.000
Learning English in a class like this is enjoyable.	5.10	1.12	3.91	1.08	132	6.281***	.000
As a whole, the course is effective for my learning.	5.18	0.95	3.67	1.11	132	8.468***	.000
Total	35.90	4.91	25.91	3.91	127.120	13.049***	.000

*$p < .05$, **$p < .01$, ***$p < .001$

Semi-structured Interview

As Kendall (2008) asserted, qualitative interview data could gather more in-depth insights on participant attitudes, thoughts, and actions. Thus, we collected semi-structured interview data from experimental group to attain a better understanding of the students' user experience with the MPS. Many factors can influence a user's experience with a system. To address the variety, factors influencing user experience can be classified into three main categories: user's state and previous experience, system properties, and the usage context (situation) (Hassenzahl & Tractinsky, 2006; ISO FDIS 9241-210, 2009). The opinions of students' user experience are classified into aforementioned three categories and described as follows.

1. User's state and previous experience
● *The MPS sometimes brings a little competition.*
● *By preparing and loading the resources required for a lesson in advance, we generate a kind of smoothness in our organizational activity, maintain a momentum to the flow of the lesson and feel that we keep others engaged more continuously than with traditional resources.*
● *The use of the MPS engages me in my pace of learning.*
● *Making processes happen more quickly than traditional blackboard. We can provisionally change the contents and repeatedly respond to the input. (This is also classified into usage context)*

2. System properties
● *I can easily move from one thing to another and this keeps the pace going.*
● *The IWB enables the range and the variety of materials for learning.*
● *Teacher uses the 'reveal' tool to focus attention on component part before revealing its place in the whole object or uses zoom/magnify to look closer at a seed to identify how it becomes attached to an animal for dispersal.*
● *We can select the appropriate words and pictures from a list.*
● *Features of same object from different views or different items displayed can be compared.*

● *The facility while using the MPS can combine visual, aural and textual display.*
● *While watching the video and providing annotations to the contexts, we do not need to switch page up and down.*

3. Usage context
● *Making processes happen more quickly than traditional blackboard. We can provisionally change the contents and repeatedly respond to the input.*

Specifically, the students highlighted that the MPS was especially valuable for combining words and pictorial representations of knowledge. The MPS can increase student engagement and help student control over the materials and processes. It seems that the use of the MPS had a positive impact on the affective dimension of the pedagogical process. According to the multimedia principle, students' understanding can be enhanced by the addition of non-verbal knowledge representations to verbal explanations (Fletcher & Tobias, 2005; Moreno & Mayer, 2007). The quality and clarity of multimedia resources may offer enhanced visual materials for presenting to a large audience, and the student is able to move between varieties of electronic resources, with greater speed in comparison to non-electronic resources, with opportunities to record and retrieve data represented. The learner-content interaction can increase students' engagement and enhance their controls over the materials and processes. Therefore, learner-content interaction improves the quality of multimodal learning environment.

In summary, interaction is such a powerful ability in human learning for improving learning effectiveness. Students do not passively accept knowledge that already exists but construct meaningful learning. The MPS in this study provides good quality software to bring students to the IWB, more directly involving them in the lesson. As Thompson and Flecknoe (2003) claimed that IWB worked best when used interactively, especially when students interact with the board themselves. Students in our case pointed out that the MPS was helpful for multimedia materials presentation and could provide a suitable and effective learning interactivity in the classrooms. The results indicated that multimodality presentations can be utilized to support the instructional activities for leading students to perceive complex ideas efficiently. Three interesting points are evident from observing the experiment as follows:

First, the MPS increases interactivities. The analysis of students' questionnaires and semi-structured individual interviews showed that the IWB technology enhance students mostly associated with interactivity and active participation (Schmid, 2008, 2010). For example, some students' statements showed that "Operating materials in front of classmates made me feel participating more in class"; "The IWB made me take a more active part in the activity than PowerPoint presentation"; and "Not just listen to what teacher said, he is joining the class". In traditional classroom, children generally took a somewhat passive role as learners. They usually simply acquired knowledge and skills, and were not engaging in their own thinking and learning. Blackboard writing was more limited in affordances and PowerPoint presentation was much less flexible in interactions than IWB. IWB was common for students coming to the board to write up ideas or drag an item into an appropriate position. Students focused attention on salient features of the task and content—labeling, highlighting, color coding, classifying—and for revisiting key points during reflective review at the end of the lesson. Second, the MPS was used to support multimedia-integrated and interactive learning. It integrated and synchronized multimedia content and provided interaction to students. For example, an image can be added to illustrate the meaning of an unfamiliar word. The displays (texts, images, sound, and diagrams) are easy for students to see or interpret. The opinions of some students from experimental group are described as above. Finally, instruction is student-centered. This study highlighted the way in which the MPS could support new opportunities to engage children in the process of learning. In an interactive multimodal learning environment, learning results depend on the actions of the learner. The finding is not similar to the quick-fire question and answer work of PowerPoint presentation. The IWB finding is also not similar to the research of Hall and Higgins (2005) that most examples observed about the control of content were fully in the teachers' hands.

CONCLUSIONS AND FUTURE RESEARCH
The purpose of this study was to develop a multimodal presentation system (MPS) to support the English learning in the elementary English as second language (ESL) course to enhance the students' learning effectiveness in the classroom setting. The results show that there are statistically significant differences between the students in experimental group and control group on measures of learning achievement and learning satisfaction. Here the mean of test scores was 79.78 (SD = 11.13) for the experimental group, higher than the 76.20 (SD = 8.61) for the control group. In addition, the mean of overall satisfaction was 35.90 (SD = 4.91) for the experimental group, higher than the 25.91 (SD = 3.91) for the control group. The MPS facilitates the ESL learning effectiveness at the interface of technology, providing high level of interactivity and multimodal

presentation, which are critical to the improvement of the whole-class teaching and learning processes. In addition, by conducting semi-structured interview of randomly selected students from the experimental group, the data show that the students are impressed by the interactive and multimodal features after study.

Several important practical implications arise from our findings. First, the MPS promotes a learner-centered pedagogy where both teacher and students are learners. For example, both teacher and students generated common topics and tried to find out the answers jointly from the internet with the MPS. In addition, the more the students interacted with the MPS, the more they became adept in using its functions and features, and the more they would like to play with the MPS to see what it could do. Second, in spite of the promising findings shown in this study, the MPS is not a magic tool for improving ESL student academic success. More specifically, MPS cannot compensate for the teacher's lack of subject matter content knowledge, capability to produce instructional materials, instructional competency, and classroom management skills. The MPS was simply a tool that improved the teacher's innate and teaching capability in the ESL classroom. However, this tool, more than the basic computer and overhead projector, offered teachers a broader range of functions and features from which to provide a variety of contexts for students with diverse learning needs. Third, how and what teacher does in the classroom, normally being expressed in the teacher-student interactivities, is important to students' academic success. Smith et al. (2005) claimed that teacher-student interactivity is the primary benefit of the IWB. Based on teacher feedback and observations in the classrooms, teacher-student interactivity could promote the students' attention to instruction and participation in classroom discussions with teacher and other students. For example, as the teacher was instructing the vocabulary by using the MPS and could not implement one of the MPS features, some students actively proposed step-by-step guides to help the teacher recover the error. Subsequent investigation revealed that it was quite common for the teacher and students to help each other when technical difficulties arose in the use of the MPS.

This study contains several limitations that suggest future research directions. First, this study does not completely follow a truly randomized selection and assignment. Although the instructional approaches were assigned randomly to classes, this study nevertheless is limited in the way that in educational settings the intact classes are already constructed before the research is begun. Efforts to replicate this study using a truly random design would be helpful. Second, this study evaluates the post-test scores concerning learning achievement. Further research should include a delayed post-test for evaluating whether there is a stable and persistent change in the vocabulary learning. Moreover, further research should examine whether and the extent the MPS is able to help ESL students learn more materials in the same unit of time or learn a given unit of materials in less time than students in traditional classrooms. Finally, this study evaluates the learning effectiveness of elementary student in the context of ESL subject. Further research should investigate the potential of its use in other subject areas, such as art or math, or for students at other elementary grade levels or in higher education to generate empirical evidence with greater generalization.

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EFFECTS OF APPLYING BLOGS TO ASSIST LIFE EDUCATION INSTRUCTION FOR ELEMENTARY SCHOOL STUDENTS

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ABSTRACT
The purpose of this study aims to explore the effects of applying blog-assisted life education instruction to fifth-grade elementary school students. The subjects were 30 fifth-grade students from southern Taiwan. The teaching experiment lasted 10 weeks with three sessions conducted each week. In the experiment, instructional effectiveness and the students' life values were measured by the Life Education Values Scale, the Learning Effectiveness Scale, the Learning Attitude Scale, an e-portfolio, the students' learning sheets, blog articles, the observation records of the teachers' instruction, and the teachers' reflection journal. The findings of this study show that the blog-assisted life education course is effective for higher-grade elementary school students. Additionally, the students' information literacy and interests can be improved through e-portfolio in a blog-assisted life education course. Moreover, the students' information literacy and competence, course satisfaction, collaborative learning attitudes, and attitudes toward blog use are improved. Finally, the students' life education values are significantly enhanced through the blog assisted instruction in this study.
Keywords: blog-assisted instruction, collaborative learning, life education, e-portfolio

INTRODUCTION

In 2009, the typhoon Morakot seriously damaged southern Taiwan and reminded people of the impermanence of life and the power of nature. Life education has been carried out for 10 years, but we still encounter some careless parents who kill themselves by carbon monoxide poisoning when burning charcoal with their children. Students are helpless regarding their future. When measuring Taiwan's competitiveness on the national happiness index, will the effectiveness of life education be the key? Life should not be treated as a slogan. It should be celebrated, and people should cherish themselves, respect others, and demonstrate life values (N, Y. Huang, 2010). Life education must be based on instruction for children, and positive personalities should be constructed in elementary school. Daily life practices depend on reflecting on life through life education (Lee, 2007).

With the rapid advances in technology, blogs have various applications. Isman (2012) pointed out that educators are increasingly using technology in all aspects of their profession. Specially, blogs are free and easy to use. They record learning processes and share feedback. Blogs not only provide a learning environment but also effectively construct paths for communication between teachers and students and encourage collaborative learning among classmates. Su (2008) suggested that use of blog does not require advanced knowledge; however, as an interactive platform, it can have the characteristics of a class operated by teachers. Chuang (2005) indicated that blogs are extremely suitable for innovative instruction and that they are good collaborative learning tools. Blogs also provide a feature that enables readers to visit the entire posting history, making it is easy to track an individual's learning progress or to maintain a reflective record over a period of time (Killeavy & Moloney, 2010; Wang & Hsua, 2008; Wheeler & Lambert-Heggs, 2009). Among various learning methods, collaborative learning best encourages the students' cooperation, and it results in dependent and active relationships. Group discussions, communication, and the sharing of results and experiences will not only enhance positive interpersonal interactions, but also enhance learning effectiveness.
Traditional learning poses the challenge of handling a great amount of data, as reorganizing and keeping portfolios is complicated.

In the E-era, through computer technology, learners can create, save, reorganize, and maintain portfolios and even share them with others. Learning activities are no longer limited to classrooms. Blogs can be used to share portfolios and save learning processes, and are also suitable for portfolio recording. Through the implementation of a life education course with blog-assisted instruction for fifth grade students in an elementary school, this study intends to allow students to learn about life's meanings and values in a collaborative environment under the instructor's guidance. Students learn to love themselves and others, to respect themselves and others and to care for society and nature. Through blogs, the students' learning process of the life education course can be recorded. Therefore, this study aims to investigate higher-grade elementary school students' blog-assisted life

education instruction, to explore the effectiveness of implementing blog-assisted life education, and to assess how students' life education values change after experiencing the blog-assisted life education course.

LITERATURE REVIEW
Life education
Over the past few years, life education has become an important subject in Taiwan. Chang (2006) defined life education as the study of life and death and suggested that life education should be part of the educational curriculum. Students should learn about and respect their own and others' lives and should create a wonderful life as well as to enhance their quality of life. According to Hung (2009), the core of life education is to learn to cherish time, resources, and life. Prior studies tended to divide life education into education about self-realization, cherishing life, mutual respect, holistic study, sympathy, tolerance, and putting into practice. Additionally, the purpose of life education is to teach students self-respect, career planning, gratitude to others, mutual respect, care for nature, environmental protection, and sustainability (Wu, 2009). Huang (2008), Wang (2009), and Lu (2009) adopted a quasi-experiment including field language or picture book instruction to explore the effects of life education for higher-grade elementary school students. To date, no prior studies adopted blogs to assist in teaching life education for younger children were found in literature. Thus, this study aims to explore the effects of life education values, learning attitudes, and learning effectiveness of the fifth grade students by using blog-assisted instruction to life education course.

Blog
Blog is an abbreviation for weblog, which is a personalized online media, allowing individuals to share personal information and interact with each other (Lou, Wu, Shih, & Tseng, 2010). Because a blog does not require significant technical skills to navigate, users can easily express their opinions on a webpage, post articles, upload photos and videos, and interact with readers. Liao (2007) suggested that it is feasible to introduce blogs to the higher-grades of elementary schools because blogs have a complete functionality. Students will not spend much time learning how to operate them because they are easy and convenient to use. According to Chen (2006) and Su (2008), the methods for using blogs as an instructional application include utilizing blog as a teacher's professional platform, a medium of communication between teachers and students, an e-Portfolio, a platform for class operation and management, and a means of integrating courses. Many prior studies have identified blogs' potential to enhance student learning (Churchill, 2009; Ducate & Lomicka, 2008; Ellison & Wu, 2008; Liu, et al; Shim & Guo, 2009; Xie, Ke, & Sharma, 2008). For example, blogging has been shown to contribute to perceived learning for a majority of students in a variety of contexts (Churchill, 2009; Ducate & Lomicka, 2008). Moreover, studies on the educational use of weblogs indicate that blogs can be effectively applied to education and thus enhance students' learning attitudes (Du & Wagner, 2005; Glogoff, 2005; Birney, Barry & Eigeartaigh, 2006; Ebner & Maurer, 2007; Hall & Davidson, 2007; Lou et al, 2010; Shih, 2010).

Additionally, some previous studies on blogs mostly focused on elementary school students' learning (Wu, 2007; Wang, 2007; Su, 2008). Some of them focus on computer learning; some focus on class operation; and some emphasize reading instruction. Hall and Davidson (2007) suggested that blogs improved students' writing skills, which is evidence of the flexibility of blogs. Amir, Ismail, and Hussin (2011) concluded that blogs offer students a high level of autonomy to interaction with peers as well as benefit students by allowing them to share their collaborative writing in an interactive social environment. To date, no research supporting life education courses using blogs has been conducted. Thus, building upon the characteristics of blogs, the present study enables students to use technology, increase their literacy in information use, and enhance their life education values.

Collaborative learning
Collaborative learning is an educational approach which involves groups of learners working together to solve a problem, complete a task, or create a product (Gerlach, 1994). It is based on the constructivist theory of learning, which asserts that people are active learners and must construct knowledge for themselves (Geary, 1995) via interaction between the individual and the environment (Schunk, 1996). Collaborative learning also suggests grouping students according to gender or competence. Students can be divided into groups of 4 to 6 members according to their gender, race, competency, and social economic status in order to provide them more opportunities to interact with each other and share experience and opinions with others in order to accomplish the learning objectives (Yang, 2006). The characteristics of collaborative learning, therefore, are defined as heterogeneous grouping, dependency, face-to-face interaction, personal responsibility, social skills, and group process (Huang, 2001; Johnson, Johnson, & Holubec, 1994; Slavin, 1995). With the prevalence of the Internet, collaborative learning using online multimedia has become the new model of learning. Additionally, collaboration can be supported for different instructional ideas and computer applications, and thus interaction methods have been proposed (Crook, 1994). Generally, any interaction through computers has to be led and

mediated by a tutor or a group of tutors (Vuopala, Hämäläinen, & Lindfors, 2007). Sun and Lin (2007) suggested that online collaborative learning means turning the students' face-to-face learning situation into a computer technology-assisted learning situation.

Computer-assisted collaborative learning was a combination of computer supported collaborative work and cooperation concept. It was designed to provide learners assistance and resources while learning. Learners can learn and interact with peers and instructor as well as exchange information through internet (Wikipedia, 2012). By employing this new type of collaborative learning approach, learners will be no longer isolated while learning. Instead, they can discuss, collaborate, cooperate, and share ideas with peers to solve problems and complete their tasks. Lung (2006) concluded that online collaborative learners' learning achievement and attitude tend to be better than the traditional learners. Online collaborative learning emphasizes the learners' cooperation. The courses and assignments all stress the learner's cooperation. Students are divided into groups. With their colleagues' and teachers' interaction and assistance, they accomplish the tasks of the group with forums and e-mails.

Liaw, Chen, and Huang (2008) reported that web-based collaborative learning systems allow more opportunities for learners to participate without limitations on their level of knowledge. Collaborative learning strategies (e.g., group learning and cooperative learning strategies) can be applied to many instructional scenarios (Bravo, Redondo, Ortega, & Verdejo, 2006; Hwang, Wang, & Sharples, 2007; Wang, 2009). Thus, in the present study, life education refers to online learning that allows students to discuss, communicate, and share their information and ideas with each other and thus to enhance learning effectiveness through positive teacher-student interactions.

E-Portfolio

In education, a portfolio refers to a "process folio." The construction of students' portfolios allows teachers and students to recognize the learning process and learning outcomes to enhance feedback and interaction between teachers and students. Portfolios allow students to recognize their learning obstacles and problems (Chang & Tung, 2000). A learning portfolio covers the multi-faceted nature of the learning process, which empowers teachers and learners to engage in reflection and self-examination (Chang, 2001; Chang & Tseng, 2009a). Every learner can design a personal portfolio to demonstrate his or her learning process and outcomes by collecting data on specific themes (Li, 2001). With the progress of computer technology, an e-Portfolio has been developed. According to Mei (2006), an e-Portfolio is a portfolio that is saved through digital measures by computers or over the Internet. Chang & Tseng (2009b) stated that a web-based portfolio assessment is particularly instrumental in sharpening students' peer assessment skills. It is created through several steps including formulating the problem, developing forward-looking adapted solutions, testing the solution, and using tools such as mind mapping that may foster creativity (Forster, 2009).

An e-Portfolio is a structured collection of data chosen by its author to meet certain objectives. It is not necessarily shared with others, as its main function is to allow reflexive analysis by the author on his or her own activities (Schön, 1983). The digital feature not only helps to achieve a hierarchical structure but also allows a hyperlink structure to be designed to incorporate changes (Metza & Albernhe-Giordana, 2010). Yueh and Wang (2000) pointed out that e-Portfolio can enhance instructional quality, instruction, and learning as well as to increase learners' autonomy, improve information literacy and competence, and save space for work. Moreover, e-Portfolio is learner-centered, realistic, and it is a good media for communication. Thus, using e-Portfolio in life education instruction allows students to preserve their portfolios and increase information flow and sharing. For teachers, using e-Portfolio can enhance professional knowledge and skills. Therefore, this study anticipates that students can better understand themselves, respect others, care for others, and cherish things. Thus, the students will be able to have appreciation for society and nature through the learning of life values in e-Portfolios with blog-assisted life education instruction

RESEARCH METHOD
Research structure and design
This study aimed to explore the effects of applying blog-assisted instruction to life education course for fifth grade elementary school students. The research framework is shown in Figure 1.
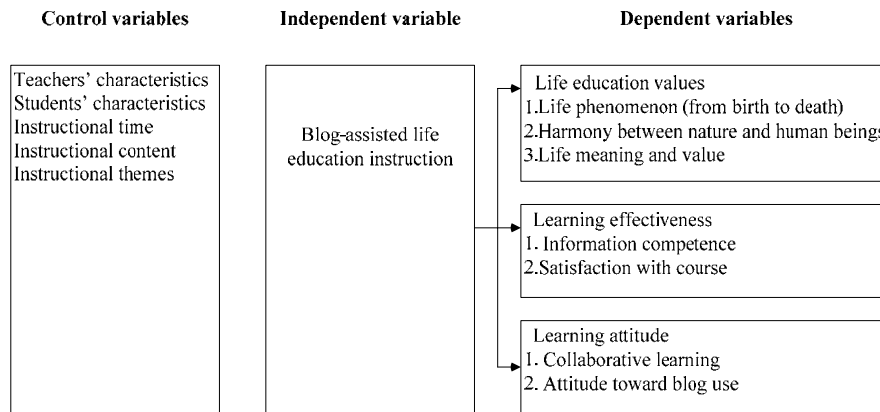
Figure 1. Research framework.

This study employed a quasi-experimental approach. The experiment variable was blog-assisted life education instruction; the dependent variables were life education values, learning effectiveness, and learning attitudes. A pretest and a posttest of "The life education values scale" were employed to the fifth grad students before and after the teaching experiment. "The blog-assisted life education learning effectiveness scale and attitude scale" was also employed. Heterogeneous grouping was adopted according to the students previous years' performance in subjects of language, comprehension, and art and humanities. A total of 29 students (15 males and 14 females) were divided into 7 groups. The experiment lasted 10 weeks with 10 instructional themes, including Song of Life, Who Am I, It's Good to Have You, Love's Everything, No More Vagabond Life, It's Not My Fault, Warming Earth, I'm Little Volunteer, Pass Love Forward, and Dreams Come True.

The instructional steps consisted of implementation and completion. In the beginning of the course implementation, the students were taught face to face with film appreciation, experiential activities, Q & A, and group discussions, followed by the blog learning. The students could post their opinions and thoughts to share with others. The instructor observed and recorded the students' online interactions between groups. During the instructional sessions, the instructor provided assistance to the students or guided them as needed. At the final stage of the instructional steps, the students had to post 10-time learning records of computer-assisted life education on the blogs, containing teaching materials, their own articles, the instructor's feedback and comments, and some of the students' fine works. Through this step, not only the instructor could observe the students' learning, the students also were able to observe the students and understand their personal growth and life values. Figure 2 shows the instructional steps.
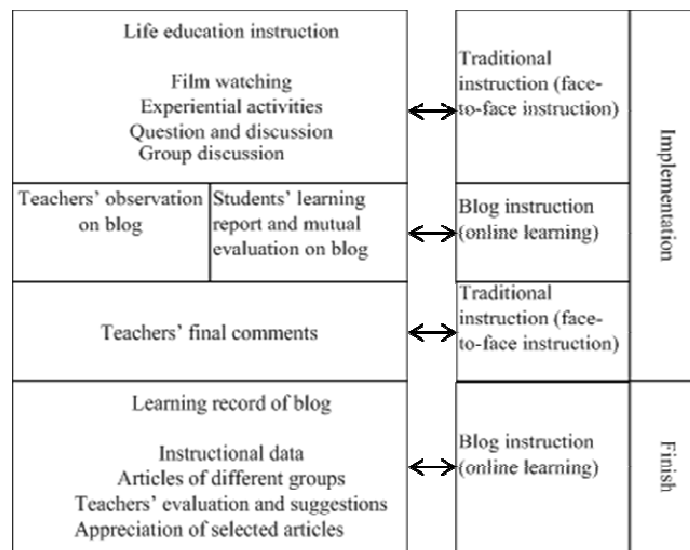
Figure 2. The instructional steps for the blog-assisted life education course

Research questions
The research questions are listed as follows:
1. What is the ideal instructional model of blog-assisted life education course for elementary school students?
2. Can blog-assisted instruction significantly enhance the elementary school students' attitudes toward life education?
3. Can blog-assisted instruction significantly improve the elementary school students' learning effectiveness?

Research tools
The life education values scale
The Life Education Values Scale in this study was adopted from Nien's "The Life Education Values Scale" (2009, p. 219). The original subjects in Nien's study were second grade students. Three university professors carefully examined Nien's original scale and agreed that the scale was suitable for the fifth grade students in this study. The 5-point Likert scale questionnaire contains 29 questions including 9 questions in life phenomenon (from birth to death), 10 questions in harmony between nature and human beings, and 9 questions in life's meaning and value.

The blog-assisted life education learning effectiveness scale and the blog-assisted life education learning attitude scale

Both the blog-assisted life education learning effectiveness and attitude scale were constructed by the researchers. Then Delphi technique was used to establish the content validity. Two university professors and three senior and experienced teachers in life education field validated the scales. After the 3 rounds of revisions on the scales, the formal versions of the scales were established. The learning effectiveness scale contains 21 questions, including 10 questions for information literacy and 11 questions for course satisfaction. The learning attitude scale contains 21 questions, including 12 questions for collaborative learning and 9 questions for attitude toward blog use.

E-Portfolio scoring
E-Portfoilo scoring contains the following three domains: organization, content, and creativity of the blog articles. These three domains were established by the instructor (researcher) and one senior instructor in the field. A 5-point Likert scale was adopted to assess the 10 articles on the blogs of 7 different groups. The instructor (researcher) and the senior scored the articles. In order to establish the inter-rater's consistency of scoring and its reliability, the Spearman Rank Correlation was conducted. The scores for organization, content, creativity, and overall performance reached the significance level of .05, indicating the two scorers' scorings were consistent.

The platform for blog articles
Uschool was used as a blog platform for the students to share outlines and reflections on the 10 themes of life education. An entry page of the blog platform and a sample of a teacher's comment and a student's follow-up feedback are shown in Figures 3 and 4.

Figure 3. The entry page of the blog platform (in Chinese)

Figure 4. A sample page of the instructor and a students' comments and feedback (in Chinese).

The quantitative data include descriptive statistics, paired sample t-tests, and one sample t-test. Qualitative data include an instructional observation records an interview before and after the experiment, learning sheets, articles on the blogs, and a portfolio evaluation. The researchers reorganized all of the data, identified the information associated with the theme instruction and adopted the quantitative analysis to enhance the students' life education values.

DATA ANALYSIS AND RESULTS
Analysis of the instructional and learning processes
Table 1 shows the summary of the 10 samples for the life education learning analysis. The results show that the changes in attitudes toward life in the 1st, 5th, and 10th topics.

Table 1: Change in students' attitude toward life.

Topic of different times	Change in attitude toward life
Topic 1: Song of life	1. When watching the film, students are surprised by the great work of childbirth. 2. In an experiential activity, a child with difficulty concentrating keeps complaining about his tiredness. The activity time is reduced because of his agitation. 3. During the question and discussion, a student who was afraid when watching the childbirth film shares her feelings in the discussion. 4. After the activity, the group discussion begins. The leaders guide the members to discuss the outline of the course and their reflection on their learning. 5. During the blog instruction, the students' typing speed is slow, and only a few groups can accomplish it within the scheduled time; some groups even have disputes.
Topic 5: No more vagabond life	1. When watching the film and the animation, the students feel that the owner of the stray dog is too cruel. They think that the owner should take good care of the dog until it dies. 2. When sharing their opinions about the outcome, most of students hoped that Willy could have a happy ending, and only few of them expected the mercy killing. 3. During the question and discussion, the students realize that it is not easy to take care of a dog and that they should be devoted and caring. 4. During the portfolio, some leaders are uncomfortable because they write every session. They expect others to take turns. 5. During the blog instruction, the students look forward to playing computer games. Some make mistakes and cannot play the game. However, no one complains to avoid arguments.
Topic 10: Dreams come	1. When watching the film, the students recognize the continuous series of natural disasters that have occurred in recent years and appreciate the phenomenon of life. 2. In the interview, students answer the seniors' questions seriously to obtain key responses and benefit their future.

true	3. During the question and discussion, although students are confused about death, loss or separation, they still show sadness.
	4. During portfolio, the discussion of the groups is rapid. They make significant progress and can submit the discussion sheets immediately.
	5. During blog instruction, once the groups are in the computer classroom, they immediately and calmly accomplish their work. Given the previous wonderful experience, the groups realize that they can play games right after publishing the articles and sharing.

Although there were different themes each week, the changes in attitudes toward life show that the students made gradual progress in their attitudes toward and communication about the concepts. Using disputes and communication, the groups adopted a collaborative learning style and developed interpersonal relationships through discussion and sharing. The students' attitudes toward life were also enhanced through the theme learning.

Life education values

The Life Education Values Scale was developed by the researchers. Before the instruction, a pretest of life education values was conducted. After the instruction, a posttest was administered. Paired-sample t-test and the students' attitudes toward life education were analyzed. The statistical results show that the mean differences between pretest and posttest for life phenomenon, harmony between nature and human beings, life meaning and value, and the total score (M=-7.24, -6.17, -6.48, 16.90, t=-4.86、-8.20、-6.58、-7.59, p=.000 $<$ .05) have reached significance level and the posttest scores are higher than the pretest scores, indicating students' life education values are significantly different after the life education course.

After the experimental instruction, the students made significant progress regarding life phenomenon (from birth to death), harmony between nature and human beings, life's meaning and value, and their total scores. These findings are consistent with Yu (2002), Wu (2004), and Nian (2009), who suggested that the students' attitudes toward life will be enhanced in these courses. After completing the life education course, the students make significant progress on the themes of "Life phenomenon (from birth to death)," "Harmony between nature and human beings" and "Life's meaning and value." Additionally, the students' attitude toward weekly themes of life education grows and changes. Therefore, the blog-assisted life education course enhanced the fifth grade elementary school students' life education values and is worth being implemented.

The effectiveness of implementing the life education course

The effectiveness of implementing the life education course was evaluated through the students' feedback on the blog-assisted life education course, learning attitudes toward elementary school blog-assisted life education, learning effectiveness, learning sheets, blogs articles, and interview records.

The students' feedback on blog-assisted life education

According to the students' feedback, the researchers changed the students' feelings toward life education. In total, 17 subjects (58.63%) extremely enjoyed the life education course, 11 subjects (37.93%) moderately enjoyed it, and 1 subject (3.44%) did not enjoy it. The reasons for the enjoyment included the opportunity to play on computers, acquiring knowledge, watching films on blogs, recognizing personal advantages and disadvantages through group discussions, learning interesting content, and avoiding the noon break. The reasons for disliking the course included the writing of learning sheets, the noise made by the group members, and concern about the members' lack of opinions after sharing the outlines and the learning. The order of the instructional methods favored is as follows: film watching, blog activity, experiential activity, group discussion, drama performance, feedback, teachers' explanation, briefing of illustration, discussion of questions, and filling out learning sheets. The students' favorite topics from the 10 in the course are "No more vagabond life" and "I am a little volunteer." Table 2 shows the analysis on what the students have learned from the 10 themes.

Table 2: Things the students learned in each theme

Themes	Things the students learned
Song of life	We realize the hard work of pregnant mothers. We should show filial obedience to parents and cherish life.
Who I am	They should control their temper to have more friends.
It is good to have you	We understand the natural physical and psychological changes of the elderly and get along with them.
Love is	We accept disabled people and help them persist in the face of difficulty.

	everything
No more vagabond life	Once owners decide to raise a pet, they should not abandon it. They should care for it to avoid the burden on family and society.
It is not my fault	We should not run away from problems, and we should admit when we make the mistakes. We should not be indifferent to familial, societal or environmental problems.
Warming earth	The earth is sick, and the consequences of human action will be frightening. There are continuous disasters that can harm everyone on earth. We should save energy and carbon.
I am little volunteer	Service is the purpose of life. Volunteers do not ask for anything in return for their service. We appreciate their devotion and sacrifice.
Pass love forward	If everyone shares his or her love, society will be filled with love.
Dreams come true	Death is not frightening as long as we have dreams. People should set goals for life and strive to meet them.

Analysis of the blog-assisted life education learning attitude scale

This scale includes collaborative learning attitudes, attitude toward blog use, and overall learning attitude. The mean of collaborative learning attitude was 57.28, SD=2.202, mean=4.77. The mean of attitude to blog use was 42.79, SD=1.66, mean=4.75. The mean of learning attitude was 100.07, mean=4.77, SD=3.525. All items obtain a mean of 4 or above, indicating that the students' attitude toward life education is enhanced and highly positive. Thus, further performing One-sample t test, the results show that p values are .000, reaching a significance level of .05. The results indicate that the students' collaborative learning attitudes, attitudes toward blog use, and overall learning attitudes are significantly enhanced. These results are supported by Shen (2001), Mao (2003), Shen (2005), Yang (2006), and Wells (2006), suggesting that collaborative learning can enhance learning effectiveness. In other words, combining blog-assisted life education instruction with collaborative learning can enhance the students' interactions and knowledge of life education as well as their positive attitudes toward the blog-assisted life education instruction. Through group discussions and collaborative learning with classmates allow the students to acquire knowledge and establish harmonious interpersonal relationships. In addition, using blog-assisted life education enables the students to think creatively and innovatively and to improve their writing skill and learning attitude significantly.

Analysis of the blog-assisted life education learning effectiveness scale

This scale includes information literacy and competence, course satisfaction, and overall learning effectiveness. The statistical results show that the item means and standard deviations of information literacy and competency, course satisfaction, and overall learning effectiveness are 4.75, 4.74, and 4.74(SD=2.079, 2.216, and 3.905) respectively. Additionally, p values for students' information literacy and competence, course satisfaction, and overall learning effectiveness are .000, which reached a significance level of .05. These results show that the students' information literacy and competence, course satisfaction, and overall learning effectiveness are significantly enhanced. After the experimental instruction, students' information literacy and competence, course satisfaction, and overall learning effectiveness were significantly higher than the test value of 4. This findings are supported by Liao (2007) and Su (2008), suggesting that using technology increases information literacy and competence. These results show that blog-assisted life education instruction is effective for information literacy and competence. In summary, the students learned life education through searching online information and sharing their opinions and searched information with peers, and thus learned to get along with classmates well. As a result, the learning effectiveness of blog-assisted life education is significant.

Analysis of work

The researchers selected the work and analyzed the characteristics of the students' learning sheets and the blog articles by the different groups according to the themes shown in Table 3.

Table 3 Analysis of learning sheets, blog articles and teachers' comments in each unit.

Themes	Learning sheets	Teachers' comments on learning sheets	Blog articles	Analysis of blog articles
Song of life		Students should be more thoughtful and learn from experience.		Students in the first group realize that mothers endure pain and inconvenience to protect the child's safety.
Who I am		Tears and anger cannot solve problems.		Students in the second group realized that the ill-tempered people form unhealthy interpersonal relationships. When encountering difficulties, we should face them bravely and try to find solutions.
It is good to have you		Everyone will get old. We should deal with the natural life cycle calmly and be considerate of one another.		Students in the third group suggested that although there is generation gap between the grandfather and grandson, the family love is solid.
Love is everything		With tolerance, sympathy and love, society will be harmonious.		Students in the fourth group realized that when encountering obstacles, disabled people show courage and we should emulate their persistence.
No more vagabond life		It is heartwarming to see the deep affection between human beings and dogs.		Students in the fifth group pitied the stray dog. The dogs in the animal shelter will receive a mercy killing. The students appreciate the rule about owning pets: "don't abandon them once raising them."
It is not my fault		Communicate with each other and face things bravely. Everything will be just fine.		Students in the sixth group concluded they should "deal with frustration bravely and value precious life; committing suicide is irresponsible."

Warming earth		The future of the earth is disconcerting.		Students in the seventh group realized that the earth is sick and that we should value environmental protection to avoid continuous natural disasters.
I am the little volunteer		Environmental cleanliness is everyone's responsibility.		Students in the first group recognized and appreciated the volunteers' devotion.
Pass love forward		The teacher appreciates thoughtfulness.		Students in the second group realized that they should share their love and that the power of love can be infinite.
Dreams come true		Construct a life goal and be persistent in attaining it. Then dreams will come true.		Students in the third group realized that life has four seasons. They should seize the day to lead an exciting life.

Interview outcome and instructional reflection

Results of interviews

In order to assess the 5th grade students' attitudes and values toward life education after participating in a blog-assisted life education course, seven students were randomly selected for individual interviews. A semi-structured interview questionnaire was employed to explore the students' feeling, attitude, and opinions about the implementation of the blog-assisted life education course. Regarding the blog-assisted life education course, the students suggested that they had absorbed knowledge of life and recognized the values of life and the satisfaction that comes with helping others. In terms of group cooperation, the students learned the importance of helping each other and enhanced their information competence. In group discussions on blogs, the students learned to search for information, integrate knowledge, and use blogs. They also learned to listen to other students' thoughts and accept different opinions. By sharing, they absorbed knowledge, built friendships, and cultivated a spirit of teamwork. In life education instruction, the students suggested that the most significant thing they learned was to recognize the value of life and enhance their information competence, friendships, and self-growth.

Instructional reflection

The arrangement of instructional time and selection of films: two instructional hours included watching films, answering questions, and participating in discussions and experiential activities. One session involved blog publication and sharing. There was one theme each week. Triggering the students' motivation usually wastes too much time; therefore, the time spent watching the film was reduced. Four sessions would be more appropriate. Dull or long films usually bore the students. Entertaining films are more effective. Thus, choosing proper film for 5th graders was important and critical for this study.

The students' differences and class operation: in the experimental instruction, the difference between the groups was gradually revealed. There were some special students in this study, and grouping can never be perfect. Therefore, some of the groups were very cooperative while others continued to have disputes. At the beginning

of the experiment, the blog instruction was slow and confusing. The researcher spent a great deal of time and effort on class operation. The effectiveness of and the students' attitudes toward the unit might improve if the blog instruction were implemented in the second semester.

The students' value clarification and multiple evaluations: regarding the students' questions, the instructor should immediately clarify the values. The students may be influenced by their peers or follow their classmates blindly. Once the students have incorrect concepts, they should be guided using the force of the group and the teachers' clarification of values. The students' self-evaluation or mutual evaluation may illuminate their learning obstacles and allow the researchers to help them.

Activity planning and design of learning sheets: experiential activities in each unit will help the students realize and achieve the educational purpose. Students are afraid of writing too many words and drawing beautiful illustrations. To reduce the burden placed on the students, this study did not ask them to draw the illustrations, which resulted in a dull layout. The illustrations might be better included in the future.

The ideal model after revision
Figure 5 shows an ideal model for a blog-assisted life education course. The descriptions of the model are described as follows.
1. Preparation: According to the research purposes and recent news related to life education, to construct the most proper life education course for students, the researcher s design the topic and then revise it after discussion with colleagues. To allow students to successfully share learning on the blogs, teachers must be familiar with blog use and functions. Using heterogeneous grouping and considering special students' physical and mental development, teachers should properly arrange the course for group discussion and blog instruction.
2. Implementation: Film watching and experiential activities should be implemented first. The instructor posed the related questions and clarify them through discussion will enable groups to reorganize the thematic aims and learning objectives from activities. Once they are in computer classrooms, they publish the outlines and what they have learned on blogs. Based on the group leader's decision, members take turns sharing what they have learned. Then, the instructor observed the interaction between groups and assisted them. Once they were finished, the groups read the articles written by other groups and share their comments. Finally, the groups revised the articles according to the instructor's comments.
3. Finish: Instructional films, learning sheets, instructional data, activity photos, and portfolios are placed on the blogs for students to browse at any time.
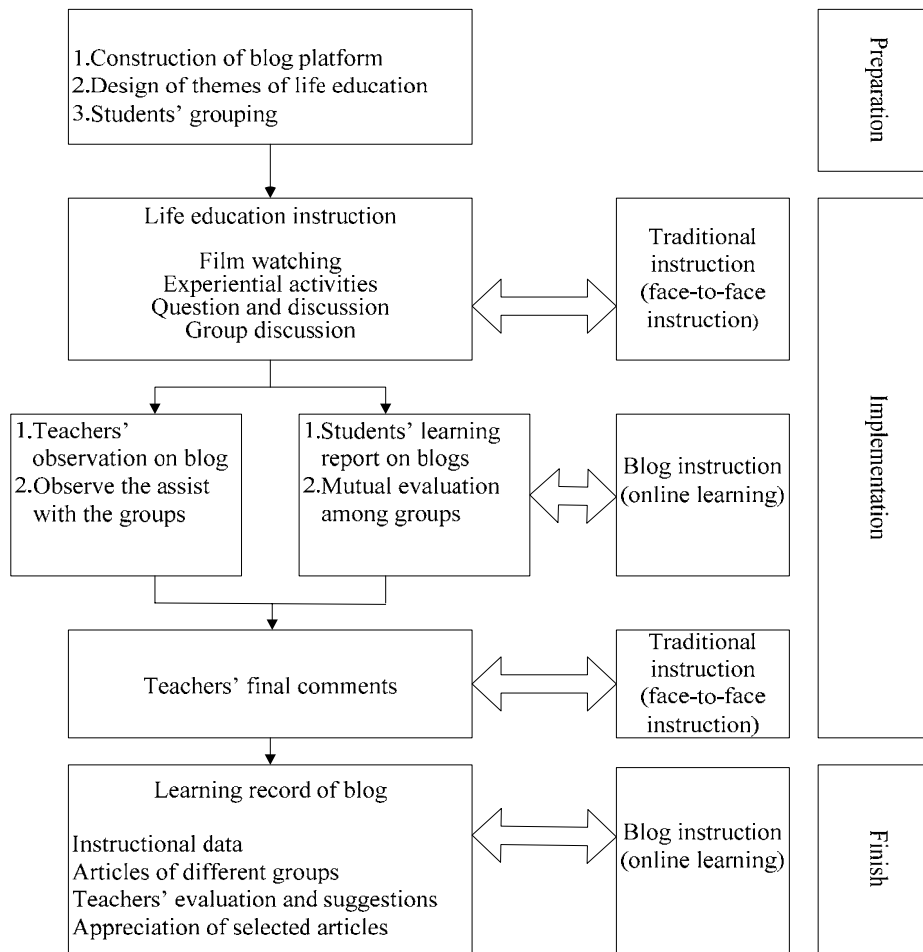
Figure 5: The ideal instruction model of blog-assisted instruction for life education.

CONCLUSION AND SUGGESTIONS

Conclusion

After the experimental instruction, the students understood the inevitability of death and were not afraid of the issue anymore. Instead, the students could get along with classmates, recognize the ways they differ from others, understand the phenomenon of life (from birth to death), pursue harmony between nature and human beings, and understand life's meanings and values. These findings are consistent with Yu (2002), Wu (2004), and Nien (2009, who suggested that attitudes toward life will be enhanced with life education courses. In other word, the blog-assisted life education instruction is effective and can enhance the fifth grade elementary school students' life education values.

Regarding learning attitudes, the students obtained more knowledge through discussions on blogs. Through blog-assisted life education instruction, the students realized the importance of collaborative learning. The group members created innovative ideas by brainstorming to enhance their learning effectiveness and saved photos, films, and learning sheets. The results are also consistent with Shen (2001), Mao (2003), Shen (2005), Yang (2006), and Wells (2006), who suggested that collaborative learning can enhance learning effectiveness and that attitudes toward blog use would enhance learning effectiveness. The students appreciated the blog-assisted life education instruction. Also, through group discussions and collaborative learning, they obtained knowledge and formed harmonious interpersonal relationships with others.

Regarding learning effectiveness, the students suggested that complete information allowed them to solve the problems. They also learned to reorganize information without copying other articles and were able to distinguish useful information according to the instructor's requirements. These results are consistent with Liao (2007) and Su (2008), who suggested that through technology, students' information competence is enhanced. Therefore, the blog-assisted life education instruction is effective for the fifth grade students. During the implementation of blog-assisted life education, the students' life attitudes have grown and changed according to

the weekly themes. Also, the students learned to respect and communicate with each other through collaborative learning and meanings and values of life after this class. Furthermore, the students learned life education through searching online information and sharing their opinions and searched information with peers, and thus learned to get along with classmates. As a result, the learning effectiveness of blog-assisted life education is significant.

Suggestions

Learning for students in higher grades differs from that of intermediate grade students. Mediocre and lazy students could be frustrated. Life education in this course is effective because the students can learn to recognize and cherish themselves, respect and tolerate others, care for the elderly and others, have concern for the disabled, establish life goals, and realize the natural cycle from birth to death. If religion related topics were included, the course could be more complete. Therefore, if the authority can construct life education platforms, and it will allow students to learn life education effectively and the educational goals would be achieved afterwards. Furthermore, life education should be included in formal courses so that the students will be able to develop positive attitudes toward life when they are young. Thus, students will respect and cherish themselves, other people, society, family, nation, and nature and will avoid social catastrophes and tragedies. An increase in experiential activities will complete life education courses. Students will recognize that the instruction and learning are more effective. Finally, life education should not be limited to some classes but integrated into all kinds of courses and advocated in our daily life.

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EFFECTS OF MULTIMEDIA-BASED GRAPHIC NOVEL PRESENTATION ON CRITICAL THINKING AMONG STUDENTS OF DIFFERENT LEARNING APPROACHES

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ABSTRACT

This study investigated the effects of graphic novels on the critical thinking skills in history learning among 291 Secondary Two students in three secondary schools in Malaysia. This research consisted of two parts, namely, development and evaluation. In the first part, the multimedia learning material entitled *'Japanese Occupation of Malaya 1942-1945'* was designed and developed. In the second part of this research, this study investigated the critical thinking effects of three multimedia graphic novel instructional modes on students of different learning approaches – deep and surface. This study utilized the quantitative method to gather information. ANOVA and ANCOVA analyses were conducted to test the five hypotheses in this study. The results showed that students who were exposed to the Graphic novel and Narration (GN) mode performed significantly better than their counterparts in the Graphic novel and Text (GT) mode and the Graphic novel, Text and Narration (GTN) mode. Both the surface-approach students and the deep-approach students who were exposed to the GN mode performed significantly better than those in the GT mode and the GTN mode. It was also found that the GN mode provides equivalent benefits to both surface-approach and deep-approach students. The interaction effects between the students' learning approach and the three learning modes related to the posttest scores were not significant. The conclusion of this study is supportive of the positive value of the GN mode multimedia graphic novel learning environment based on Mandell and Malone's Thinking like a Historian (TLH) model to enhance and facilitate students' critical thinking skills toward history learning.

Keywords: multimedia-based graphic novel learning environment, TLH model, critical thinking skills, history learning.

INTRODUCTION

The development of critical thinking is a significant goal of our education system as a crucial tool for participating in the 21st century's knowledge society. The ability to think critically and to reason well has been regarded as an important and necessary outcome of education. Prior to this, evidence of the desire to address critical thinking skills were addressed under the Malaysia's New Economic Model (NEM) which recommended that education should promote the intellectual growth of students by developing their critical thinking skills for performing successfully in a complex and rapidly changing world.

Additionally, the rapid development and advances in instructional delivery system has created a promise to ushering in a new age of learning with technology enhanced learning environments unconstrained by time and space. The infusion of computer technologies in education has the potential for improving the way teachers teach and students learn which had created a significant impact on the instructional content development and the methods of communicating information to learners. As such, the increasingly visual domination of mass communication now practiced in the world makes it both natural and essential for teachers to incorporate the visual resources into their teaching.

In the context of learning in Malaysia, educators and researchers have developed strategies to improve education based on constructivism. Several studies using constructivism learning environment has shown positive outcome whether cognitively or motivationally (Kong, 2006; Krihnasamy, 2007; Neo & Neo, 2009). These studies have shown that infusion of constructivist technology-based learning environment has created a major impact on the instructional content development and the methods of transferring appropriate knowledge to learners.

With the aforementioned introduction in view, this study aims to design, develop and evaluate the multimedia learning material embedding the philosophy of graphic novel in history learning. The focus of this study will be on the effectiveness of the interactive multimedia-based graphic novel learning environment both as a tool and instructional medium to foster students' critical thinking skills in the learning of history.

THE POPULARITY AND POTENTIAL OF GRAPHIC NOVELS IN EDUCATION

Graphic novels have the particularity of combining two very rich forms of cultural expression – the literature and the arts which make them a very effective pedagogical tool. One of the most comprehensive benefits of graphic novels is their supporting role in theories of multiple literacies (Schwarz, 2004). Instead focusing on text-based literacy, additional attention is given to critical and visual literacies (Cary, 2004). Educators will move away from "one size fits all" literacy instruction through the use of graphic novels (Carter, 2007). Multiple literacies take information and channel it through different modes. Students who do not understand a concept from direct text may understand it through the visual representation in graphic novels. In this case, graphic novels are especially important in promoting ideas of visual literacy and accommodating students who are classified as visual learners. The combination of images and words increase students' comprehension (Chute, 2008). This visual scaffold is the best way to understand the concepts the study is presenting compared with text alone. By combining both words and pictures, graphic novels have an enormous power to tell stories and to transmit messages (Williams, 2008).

Graphic novels offer a means for representing complex materials in ways that reduce the cognitive demand of reading dense text while portraying sophisticated concepts. Thus, graphic novels have been touted as being a beneficial tool for engaging reluctant and struggling readers (Sullivan, 2002; Crawford, 2004). Reluctant readers may not be able to detect certain literacy elements such as tone, mood, theme, and foreshadowing from text alone. The images in graphic novels provide these elements at a level easier to reach for many readers (Beers, Probst, & Roef, 2007). Booth (2009) stresses that through the use of graphic novels, students can make associations between the images and the text to help simplify the reading process and aid comprehension. Moreover, the simple sentence structure and visual demonstrations of literacy in graphic novels can be beneficial to struggling readers with frustrating reading experience. The text format of many graphic novels using text bubbles and short sentences may be easier to read and less daunting for struggling readers (Little, 2005). The reduced amount of text and attention-grabbing graphics in graphic novels motivate reluctant readers, enable struggling readers, and even challenge the higher-level learner infer, predict, and reflect on what they read (Frey & Fisher, 2008).

Aside from engagement, graphic novels also help to develop analytical and critical thinking skills through thought-provoking discussions that occur after reading (Frey & Fisher, 2008). Graphic novels are becoming more important today as classrooms are becoming more diverse, and more expectations are being placed on students to be creative and independent thinkers (McVicker, 2007). One of the advantages of using graphic novels to bring critical thinking into the classroom is that they are often shorter and quicker to read than other texts. Graphic novels are not only creative in nature but also encourage creative explorations, experimentation, discovery, and innovation. It is also quick to branch out into theme representing cultures and ethnicities around the world. While some graphic novels allow a release from reality in superheroes and fantasy adventures, family relationship, first romance, abuse, homelessness, and youth subcultures, many historical concepts have been written about in graphic novel such as Art Spiegelman's *Maus* (1986, 1991) concerning the event of Holocaust during War World Two. In this case, graphic novel provide a unique, personal insight into historic events and political situations which could be used to promote critical thinking discussion in history and social studies classes (Schwarz, 2004).

While much has been said about the potential and learning with graphic novel, what role can the graphic novel as the visual element play in the history classroom? Studies by Tally and Goldenberg (2005) demonstrate that historical images – photos, lithographs, cartoons, and maps present instantly recognizable features and information that promote historical thinking among students. Moreover, the visual impact possessed by graphic novel was believed to contain the dramatic power to convey important truths about human situations (Lavin, 1998). Whereas Buhle (2007) and Zinn (2008) in their studies stated the potential of graphical histories address crucial issue in society such as war, poverty, justice, inequality, and gender rights enable and prepare students to respect other people and cultures in a democratic society. Moreover, Study by Schnakenberg (2010) promoted graphic novel as initial stimulus material to motivate student towards history learning.

Heinich et al. (2002) stated that the realism of a visual element did not always ensure effective communication but under certain circumstances, realism actually interfere with effective communication and hamper learning. Visuals tend to become less useful in instruction as they approach the extremes of very abstract or very realistic (Heinich et al., 2002). Learner will be distracted from the minor details and miss the centre thought of representations either the realism of a figures are too much or too little. Therefore, cartoon or partially real object is more effective for graphical representations.

Thus, the central issue in this study is to find out whether the concept of graphic novel provided by multimedia environment facilitate the learning of history by the students. Given the visual and audio power of this multimedia-based graphic novel learning environment, history teaching can be effectively and vividly presented and would encourage the development of an increasingly student-centered, active-learning curriculum by facilitating the birth of what came to be known as "history in the graphic novel" as proposed by history scholars in the 21st century (Frey & Noys, 2002).

CRITICAL THINKING SKILLS IN HISTORY

One of the main aims of history learning is the development of critical and creative thinking in order to provide students with the necessary tools to become active and autonomous citizens, as well as lifelong learners (Levstik & Barton, 1997). These competencies can be achieved through the stimulation of students' deep learning, namely through questioning or inquiry-based learning. Questioning play a central role in the process of teaching since students' learning, thinking, participation and their level of engagement depend on the kind of questions teacher formulate (Levstik & Barton, 2005). In other words, questions initiate and maintain interaction and discussion in the classroom, it stimulate thought and is one of the greatest impacts on students' critical thinking skills.

Past research indicated that questions can be used to activate learners' meta-cognitive processes that result in more efficient learning and engaging students in analysis, problem-solving and inquiry process (Ikuenobe, 2001). Teaching techniques that promote memorization do not support critical thinking skills among learners. Critical thinking skills is a cognitive process that requires a higher level, deeper thinking logic, analysing, inferring, judging, planning and problem solving (Scriven & Paul, 2008). Therefore, instruction that supports critical thinking uses higher cognitive questioning techniques that require students to analyze, synthesize, and evaluate information to solve problem and make decisions (think) rather than merely to repeat information (memorize) (Hazri, 2003).

This study attempts to integrate Mandell and Malone (2007) Thinking Like A Historian (TLH) model to facilitate historical thinking skills, going beyond the prescribed textbooks in order to have students engage in doing history, a process of producing works by logical thinking process and questioning the clues of the past (historical evidence/materials) with a critical approach. It is suggested that the use of TLH model in the constructivist learning environment with questioning approach motivate the learner to expand and find more about into the subject area thus creating a lasting interest in history learning.

THINKING LIKE A HISTORIANS MODEL

Thinking Like a Historians (TLH) model serve as a framework and historical literacy method in history teaching and learning through historical themes while analyzing and interpreting the historical concepts in order to make connections and apply the knowledge. TLH identifies historical study as a 3-steps historical process as follows;

1. Asking questions about the past
2. Gathering sources and evaluating the evidence in those sources
3. Drawing conclusions, supported by the evidence, that answer the questions

TLH incorporates the historical process (the disciplinary skills and procedures that historians use to study the past) and historical categories of inquiry (the conceptual patterns that historians use to make sense of the past). It determine a focus for questions by engaging students in historical meaning making through the use of five categories of specific inquiry questions based on the skills of inquiry used by historians. The intended outcome is that students will gain a better understanding of what is 'doing history'. In other words, it is the improvement in the skills of developing arguments from evidence and developing relevant and answerable research questions. The five categories of inquires serve as the way of organizing investigations and interpretations of the past as follow;

1. *Cause and Effect* – What were the causes and effect of past events?
2. *Change and Continuity* – What has changed and what remained the same?
3. *Turning Points* – How did past decisions or actions affect future choices?
4. *Using The Past* – How does the past help us make sense of the present?
5. *Through Their Eyes* – How did people in the past view their world?

This research asserts that students' critical thinking skills can be more successfully met when apply a constructivist approach to teach history. By incorporating the TLH as the framework into the design of the multimedia-based graphic novel learning environment through its variety of tools which provide rich

information with the possibilities for individualized instruction and interactive component, history topics will come alive for students, offering new light to boring facts with photographs, animated images, maps and narration. Students are given the opportunity to examine information, consider alternative, collaboration and multiple sources of information, all in an effort to reach their own conclusions, making learning an active process and thus enhancing and facilitating their learning in history.

DESIGN AND DEVELOPMENT OF THE MULTIMEDIA LEARNING MATERIAL

The design and development of the multimedia learning material in this study incorporating Mandell & Malone TLH model of historical thinking, Mayer's (2009) cognitive theory of multimedia learning, Sweller's (2005) cognitive load theory, and Keller's (2010) motivation model. The history learning material was constructed based on the principles and guidelines derived from these models and theories. Adobe Flash CS3 was the programming tool for designing and Adobe Illustrator CS3 was used to edit some of the graphics. The animated part of the graphic novel images and text was created by Flash program. This study was conducted by developing three modes of interactive multimedia courseware, namely Graphic novel and Text (GT) mode, Graphic novel and narration (GN) mode and Graphic novel, Text and Narration (GTN) mode. Graphic novel and Text (GT) mode provided the content in the form of simultaneous on-screen text next to the graphics (Figure 1). Graphic Novel and Narration (GN) mode provided the verbal content in the form of simultaneous audio narration with the graphics (Figure 2). Graphic Novel, Text and Narration (GTN) mode provided both audio narration and on-screen text with the graphics (Figure 3).

Figure 1: GT mode

Figure 2: GN mode

Figure 3: GTN mode

METHOD

A quasi-experimental design was conducted in this study to investigate the effects of the three modes of multimedia graphic novel treatment used to measure students' performance scores towards history learning. A 2 × 3 quasi-experimental factorial design was used to investigate the three modes of multimedia treatment on students' performance scores at each category of the learning approach (surface and deep) of the students. Analyses for the moderator effects in the factorial design are shown in Figure 4.
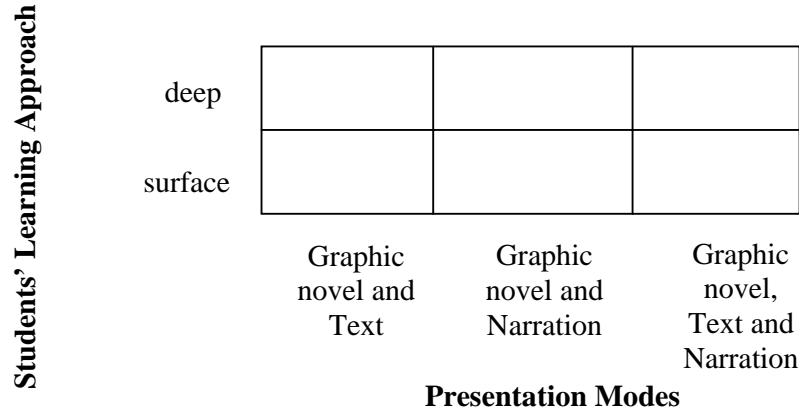
Figure 4: A 2 × 3 quasi-experimental

This study employed one of the major types of the quasi-experimental design, the non-equivalent control group design, whereby similar intact classes were randomly assigned to their respective treatment group (Gay, Mills & Airasian, 2009). The three treatment groups were pretested, administered a treatment, later posttested and interviewed.

Research Design

The three different modes of presentations were given to three different treatment groups. The students' distribution within the treatment groups were conducted randomly. The details of the research's treatments and instruments were administered as in Figure 5.
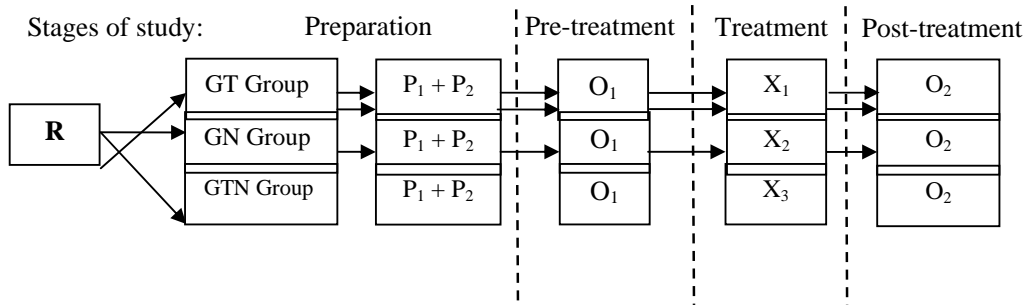
Figure 5: Research design of the study.

R = Random assignment
GT = Graphic and Text Group
GN = Graphic and Narration Group
GTN = Graphic, Text and Narration Group
P_1 = Briefing to the teachers regarding teacher actions during the study
P_2 = Briefing to the students regarding the courseware prior to treatment
O_1 = Pretest
X_1 = Treatment using the Graphic and Text mode
X_2 = Treatment using the Graphic and Narration mode
X_3 = Treatment using the Graphic, Text and Narration mode
O_2 = Posttest

Variables

The independent variables in this study were the three modes of multimedia treatment, namely, GT, GN and GTN. The dependent variables are the performance scores of the students. Students' performance refers to the posttest scores. The moderator variable was the students' learning approaches, surface and deep learning approaches.

Sampling

The population of this study comprised Form Two students from three Malaysian secondary schools. They range in age from 14-15 years old. The students involved have not been exposed to the topic entitled *"Japanese Occupation of Malaya 1942-1945"*. A list of secondary schools in Penang Island that fulfilled certain criteria such as (a) similar socio-economic background, (b) co-education, and (c) well-equipped with multimedia computer laboratories were prepared. Three different secondary schools were randomly selected (based on the simple random sampling technique) from the list. For each school, three intact classes were chosen. As the students in these schools were streamed based on their overall academic performance, this facilitated the selection of the three classes which were involved in the study. One class was of above average ability, one class of average ability, and the other class of below average ability. Each of the three classes from the same school was assigned to the same treatment. The three schools were randomly assigned to either one of the three treatment modes namely the Graphic novel and Text (GT) mode, Graphic novel and Narration (GN) mode, and the Graphic novel, Text and Narration (GTN) mode.

Data Collection

Four weeks before the subjects were exposed to the experimental treatment, the pretest was administered during a 45-minute lesson. Another 40-minute lesson was used to administer the LPQ test. During the experimental treatments, three classes from each of the sample schools used the three versions of the multimedia learning materials in the computer lab respectively. The subjects were required to explore and study the learning materials in six different 40-minute lessons. Immediately after the instructional treatment, the students were required to complete the posttest. The researcher gave strict instructions prior to the data collection procedure to maintain consistency of the implementation of the designed lesson.

Internal and External Validity

This study employed pretest-posttest quasi-experimental design which involved random assignment of the intact groups to treatment, rather than random assignment of individuals. In this type of experimental design, validity threats or extraneous variables such as regression and interaction between selection, maturation, history and testing may arise (Gay, Mills & Airasian, 2009). If these extraneous variables are not controlled in the experiment, the observed differences in the experimental groups may be due to the extraneous variable and not to the experimental treatment.

To minimize these threats, the following steps were taken to ensure the internal validation of this study:

   i.   To minimize threats to internal validity due to maturation or history of the subjects, the experimental study was carried out for a brief period of three weeks.
   ii. To minimize the "test-wise" effect, the pretest was conducted four weeks before the treatment. The treatment was then conducted for the period of three weeks. The gap of 8 weeks between the pretest and posttest is long enough to reduce the threats of "test-wise" effect. The pretest questions were rearranged and the posttest was given immediately after the treatment so that the students might not remember the questions given in the pretest.
   iii. To prevent the interaction of the students, the three schools selected were randomly assigned to one of the three multimedia instructions. Each student of intact classes was provided with an independent computer to avoid any interaction.

To minimize the threat to external validity, the following steps were taken:

   i.   First the three schools were carefully chosen to ensure similarity in terms of age, sex, scholastic aptitude, achievement and socio-economic status of the pupils.
   ii. The pretest was used as covariate to ensure the equivalence of the groups in their prior knowledge and pre-requisite ability before taking part in the treatment. Analysis of covariance (ANCOVA) was used to statistically equate the groups.
   iii. To minimize the Hawthorne effects, the students involved in the treatment were not informed regarding the treatment implementation. In this study, the treatment was conducted in the school computer laboratory during the normal history lesson period.
   iv. To minimize the experimenter effect, the study was conducted by history teacher assistants with detailed descriptions of procedures and explicit directions.

FINDINGS

A number of statistical analysis techniques were employed, namely descriptive analysis, Pearson correlation, analysis of variance (ANOVA) and analysis of covariance (ANCOVA). One-way ANOVA was used to find out whether they were any significant difference in the mean posttest scores between the three learning modes, whereas one-way ANCOVA was conducted to compare the effects of the three treatment modes on students' performance toward the multimedia graphic novel lesson. The data was analysed to determine if there was any significant difference in the adjusted mean of the dependent variable (posttest scores) between the three treatment modes, while controlling the pretest scores as the covariate. Two-way ANCOVA was also employed to test the interaction effect between the treatment modes and students' preference learning approaches (Surface and Deep). The results of inferential statistics was discussed based on the hypotheses of this study at the significant level, p=0.05.

Hypothesis Testing
Hypothesis 1
There is no significant difference in the mean posttest scores between students using the three treatment modes (GT, GN, and GTN).

Table 2: Descriptive Statistics of Mean Posttest Score of the Three Treatment Modes

Variable	Treatment Mode	N	Mean	Standard Deviation
Posttest Score	GT	99	52.28	12.578
	GN	100	59.72	10.420
	GTN	92	55.62	10.144

Table 3: One-way ANCOVA Results for Posttest Scores by Treatment Mode With Pretest Score as Covariate

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Covariate: Pretest	10290.903	1	10290.903	116.609	0.000
Main Effect: Treatment Mode	**3248.994**	**2**	**1624.497**	**18.408**	**0.000**

[a]R Squared =0 .341 (Adjusted R Squared = 0.334). p < 0.05

The results of ANCOVA in Table 3 indicates a significant difference existed between the posttest score of the three treatment modes, $F(2, 287) = 18.408$, $p = 0.000$. It can be concluded that after statistically controlling for the pretest score (covariate), the Multimedia Graphic Novel treatment in the form of GT, GN and GTN did have an influence on the posttest score. The students exposed to the GN mode obtained significantly higher mean posttest scores than the students who were exposed to the GT mode. The students exposed to the GN mode also obtained significantly higher mean posttest scores than students who were exposed to the GTN mode. Besides, the students exposed to the GT mode obtained significantly higher mean posttest score compared to the students who were exposed to the GTN mode. Therefore, this hypothesis was not supported.

Hypothesis 2
There is no significant difference in the mean posttest scores between surface-approach students of the GN mode and the deep-approach students of the same mode.

Table 4: Means, Standard Deviations, Adjusted Means, and Standard Errors of Posttest Score by GN Learning Modes for Surface and Deep-approach Students

Posttest Score					
Learning Approach	N	Mean	Std. Deviation	Adjusted Mean	Std. Error
Surface	65	58.338	10.8430	58.847[a]	1.088
Deep	35	62.300	9.1845	61.356[a]	1.486

Table 5: ANCOVA of Mean Posttest Score by Learning Approach With Pretest Score as Covariate for GN Mode

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Covariate: Pretest	2974.833	1	2974.833	38.901	0.000	0.286
Main Effect: Learning Approach	**140.999**	**1**	**140.999**	**1.844**	**0.178**	**0.019**

[a]R Squared =0 .310 (Adjusted R Squared = 0.296). p < 0.05

The results in Table 5 show that there was no significant difference in the mean posttest scores for the surface and deep-approach students exposed to the GN mode, $F(1, 97) = 1.844$, $p = 0.178$. Although the deep-approach

students obtained higher adjusted mean posttest scores of 61.36 compared to the surface-approach students with an adjusted mean posttest score of 58.86 by the GN mode (Table 4), the difference was not significant. Therefore, this hypothesis was supported.

Hypothesis 3

There is no interaction effect between students' learning approaches and the treatment modes related to the mean posttest scores.

Table 6: Two-way ANCOVA of Posttest Score by Treatment Mode and Learning Approach With Pretest Score as Covariate

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Covariate: Pretest	9773.742[a]	1	9773.742	111.228	0.000	0.281
Main Effect: Treatment mode	3249.470	2	1624.735	18.490	0.000	0.115
Learning Approach	279.921	1	279.921	3.186	0.075	0.011
2-way interaction: Mode*approach	85.800	**2**	**42.900**	**0.488**	**0.614**	**0.003**

[a] R Squared =0 .351 (Adjusted R Squ38431.796ared = 0.337). p < 0.05

Table 7: Means, Standard Deviations, Adjusted Means, and Standard Errors of Posttest Score by Treatment Mode and Learning Approach

Treatment Mode	Learning Approach	N	Mean	Std. Deviation	Adjusted Mean	Std. Error
GT	Surface	54	50.148	12.3958	50.642[a]	1.276
	Deep	45	54.700	12.4793	53.779[a]	1.400
GN	Surface	65	58.338	10.8430	59.267[a]	1.326
	Deep	35	62.300	9.1845	61.652[a]	1.447
GTN	Surface	50	55.150	7.8800	55.139[a]	1.166
	Deep	42	56.179	12.3939	55.645[a]	1.586

The results of the two-way ANCOVA are shown in Table 6. It was found that there was no significant interaction effect between the treatment modes and the learning approaches, $F(2, 284) = 0.488$, $p = 0.614$. This indicates that the students' learning approach did not affect the posttest scores among the three treatment modes. In other words, the effect of the treatment modes on the posttest scores did not depend on the learning approaches. Therefore, this hypothesis was supported. Although there was no significant interaction effect between the learning approaches and the treatment modes related to the mean posttest score, there were differences among the treatment modes for students of different learning approaches. Students with surface and deep learning approach who were exposed to the GN mode had a higher adjusted mean posttest score than the GT mode and the GTN mode. This is shown in Table 7.

DISCUSSION

The GN mode had a significant positive effect on learning. Students who were exposed to the GN mode significantly outperformed the students who were exposed to the GT mode. Students who were exposed to the GN mode also significantly outperformed the students who were exposed to the GTN mode. However, students who were exposed to the GTN mode significantly outperformed students who were exposed to the GT mode.

Students who were exposed to the GN mode obtained significantly higher mean posttest scores compared to students who used the GT mode. This result was supportive of the positive value of the modality principle or modality effect as proposed by Clark and Mayer (2008). The modality principle claims that students learn more effectively from graphics and narration than from graphics and on-screen text. This principle is based on the assumption that when graphics and words are both presented visually (i.e. graphic and on-screen text), the pictorial channel becomes overloaded whereas the verbal channel is not used at all. But when the written text is converted to spoken narration, it can be processed in the verbal channel, thus leaving the pictorial channel to process only the graphics. In this way, the information processed through the two channels are balanced and neither one of the channel is cognitive overloaded. This result is explained by the limited-capacity assumption of Mayer's cognitive theory of multimedia learning (2009). Indeed, this assumption that emphasizes the importance of not overloading the visual and verbal channel is closely associated with Baddeley's (1986) working memory model, Paivio's (1990) dual-coding theory, and Sweller's (2005) cognitive load theory.

Moreover, the GN mode provided equivalent benefits to both the surface-approach students and the deep-approach students. This was confirmed by the statistical results that the posttest scores of the deep-approach students did not differ significantly from the posttest scores of the surface-approach students of the same mode. This indicates that students benefit more in the GN mode irrespective of their different learning approaches.

The use of graphic novel and audio narration to explicitly present the historical scenario helped the students to stay oriented in the GN mode greatly and reduced the students' need to use their existing limited cognitive capacity. In the GN mode, the way for students to understand the spoken words was through the verbatim instruction method (audio narration). Students are able to listen and think rather than to read and memorize. This reduces the extraneous cognitive load imposed on the limited cognitive resources of the students, which subsequently enables the surface and deep approach students to spare most of the cognitive resources to build referential connections for comprehending the historical content. Whereas for those in the GT mode and the GTN mode, the students were compelled to exert an extra cognitive load in order to comprehend the on-screen text. They devoted their mental resources to activities not directly related to learning. Thus, the surface and deep-approach students of the GN mode significantly outperformed their counterparts in the GT mode and GTN mode. The GN mode was suggested to optimize the information-processing rate of both the surface and deep-approach students.

The finding that both the surface and deep-approach students in the GN mode significantly outperformed their counterparts in the GT mode and GTN mode may also be explained within the context of the motive and strategy approaches to learning by John Biggs (1987). It is possible that in this study, the use of the multimedia graphic novel with thought provoking questions as suggested by the TLH model (Mandell & Malone, 2007) challenged both the surface and deep-approach students to understand the learning task which eventually encouraged them to focus their attention on the content as a whole, try to see the connections between different parts and think about the structure as a whole. In doing so, the GN mode facilitated their learning strategies of seeing, hearing and doing through the rich information provided. This indicates that the GN mode is more successful in assisting the surface approach students to learn effectively, to think aloud over the historical information rather than utilizing rote learning and studying mechanically.

In other words, the GN mode did not prohibit the adoption of a deep learning approach but enabled the surface learning approach students who preferred rote learning to adopt the deep learning approach. This is consistent with the studies by Cope and Staehr, (2005) and Hamm & Robertson (2010) which stated that incorporating a multimedia-based learning environment promotes a deep learning approach.

Marton and Saljo (1976), Dart et al (2000) and Diseth (2007) are a few of those who emphasized that individual learning approaches are highly sensitive to the learning context. In other words, the students' learning approach is influenced by their perception of the learning environment. The findings of this study support this view. The structure and context of the multimedia graphic novel constructivist learning environment tends to stimulate the students' higher cognitive skills such as analyzing, and synthesizing and evaluating history contents promotes active and independent learning which the students' perceived as safe and supportive. In this regard, the GN mode has a positive influence on the level of deep learning which ultimately affects students' performance. This explains the finding that surface and deep-approach students in the GN mode performed better than the surface and deep-approach students in the GT mode and GTN mode.

The fact that the posttest scores in the GN mode showed statistically significant differences compared to the GT mode and the GTN mode could mean that the aforementioned environment positively supported the GN mode. As such the students could analyze, synthesize and evaluate the history contents and thus improve and enhance their critical thinking skills in history learning. It is possible that the GN mode of treatment in this study fulfilled the concept of active and meaningful learning which engaged the students to go through the learning content which was best suited to their learning approach and abilities. Therefore, the GN mode was able to support better learning irrespective of the students with different learning approaches. This finding supports the view that emphasizes the need for students to develop ways of processing information from the surface approach to deep approach for higher quality learning outcomes (Swanberg & Martinnsen, 2010; Yilmaz & Orhan, 2010).

CONCLUSION

This study aimed to investigate the effects of the three treatment modes of multimedia graphic novel among students with different learning approaches. The results of this study showed the positive effects of the GN mode. Surface-approach students obtained higher motivational scores from the three treatment modes as compared to the deep-approach students. Although the deep-approach students obtained slightly higher performance scores compared to the surface-approach students in the GN mode, the statistical results showed no

significant difference. This implies that the GN mode provided equivalent benefits to students irrespective of their different learning approaches.

This indicates that the GN mode could be an effective instructional design to facilitate history teaching. The use of the GN mode with appropriate audio-visual, presented graphically, appears to be an effective way to guide students to focus on the important facts in history, analyse and evaluate the historical content critically. Thus, the students are provided with a rich opportunity to work accessibly with both visual and audio representation graphics of complicated historical facts and to see the relationship between the various parts. The GN mode with a repertoire of graphic novel and audio narration was able to re-enact the actual scenario of Japanese Occupation of Malaya during War World II which would otherwise be quite difficult to capture using the textbook. The outcome of this study provides a strong justification that the GN mode makes an effective utilisation of the creative and innovative ways of using multimedia design principles to make learning effective.

In addition, this study has provided an appropriate and feasible instructional design theoretical framework for the design and development of the multimedia learning material. Mayer's (2001; 2009) cognitive theory of multimedia learning and Sweller's (1999) cognitive load theory were used in the design features and procedures to enhance learning; Keller's ARCS model (Keller, 2010) was used to ensure that the motivation aspects were featured in the multimedia learning environment; while Mandell and Malone's (2007) Thinking Like A Historian (TLH) model enabled a constructivist learning environment that promotes critical thinking skills in history learning rather than rote learning. Therefore, the successful development of the multimedia graphic novel-based learning environment resulted in the development of a framework that can be used to guide the design and development processes of other multimedia graphic novel instructional material.

In conclusion, the potential for multimedia instruction in history learning remains high. Multimedia graphic novel should be considered in the design and development of multimedia history courseware. However, in order to effectively develop these rich potential of the learning environments afforded by multimedia technology, data from this study tempers this enthusiasm by reminding us of the need to design instructions that are consistent with psychological principles about how people are motivated to learn in order to develop an effective and potential learning environment to support the desired learning outcomes.

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E-LEARNING ENVIRONMENT FOR HEARING IMPAIRED STUDENTS

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ABSTRACT
The usage of technology within the educational department has become more vital by each year passing. One of the most popular technological approaches used is the e-learning environment. The usage of e-learning environment in education involves a wide range of types of students, and this includes the hearing impaired ones. Some adjustment or enhancement needs to be implemented within the e-learning environment, based on the needs or the adaptability of the hearing impaired students accordingly. This paper reviews some of the past researches on the usage of the e-learning environment for hearing impaired students for the past decade or so.

INTRODUCTION
There are a lot of disabled individuals who have the right to get the best education as they can get, just like their normal peers. Hearing impaired (HI) individuals are among those of people with disabilities that deserve the same rights. Hearing impaired individuals, particularly hearing impaired students, usually acquire the same level of mental capability as the normal hearing students in terms of studying. The term *'deaf and dumb'* is not practically to be used since the hearing impaired students are only lacking of their hearing capability not their intelligence level (Schwartz, 2002). Therefore, they will be undertaking the same subjects or courses in any education departments or institutions as those taught to the normal hearing students of the same age. However, a problem could occur for the hearing impaired students if the technique used by the teachers or instructors in teaching them is as the same used for normal hearing students. Thus, the usage of technology is vital in preparing the HI students with appropriate learning environment, since by using technology, the HI students could access sound in their own suitable way (Berndsen & Luckner, 2010).

E-learning environment is one of the most used techniques for educational purpose and this includes the education for HI students. However, most e-learning environment available does not particularly can be useful to those students due to its feature which is lacking in terms of adaptability. They often encounter problem in accessing the information available in terms of understanding it and using it in a proper manner (Fichten, Ferraro, Asuncion, Chwojka, Nguyen, Klomp & Wolforth, 2009). Therefore, in order to assist these HI students in accessing the information adequately, the e-learning environment needs to be developed and designed according to the needs of the HI students by adding or enhancing some features within the e-learning environment.

DISCUSSION ON SELECTED PAPERS
In this section, we present the review of past researches on the usage of the e-learning environment for hearing impaired students starting from the year 2005 until the year of 2012. Table 1 below shows the list of the studies related to the issue concerned. We begin the review with the brief explanation on the each study, followed by the approaches, limitations and also some valuable directions for future studies.

Table 1: List of studies on the hearing impaired e-learning environment

Author(s)	Year	Participants	Contents	Approach Techniques
Drigas, A.S., Kouremenos, D.	2005	Deaf adults	E-commerce and Technologies of Internet	Virtual classroom, Animation, Video streaming (sign language) and conference, Chat rooms
Straetz, K., Kaibel, A., Raithel, V., Specht, M., Grote, K., Kramer, F.	2005	Deaf adults	Mathematics and Reading / Writing	Video streaming (sign language) and conference, Chat rooms, Enhanced visualization, Template Block
Bueno, F.J., Fernandez	2007	10 profound prelingual	Basic Computing	Knowledge database,

del Castillo, J.R., Garcia, S., Borrego, R.		deafness, 1 severe prelingual deafness, 1 HOH (all secondary school level)		Text adaptation, Image, Video streaming (sign language)
Ng, C.K., Liew, Y.T., Saripan, M.I., Abas, A.F.	2007	Blind and deaf students	General Education	Video conference, Voice-to-text
Khwaldeh, S., Matar, N., Hunaiti, Z.	2007	Deaf students	Mathematics	Virtual classroom, Video conference, Image, Subtitles, Chat rooms
Al-Osaimi, A., Alfedaghi, H., Alsumait, A.	2009	42 deaf and HOH students	Kids' Education	Enhanced user interface
Al-Bayati, M.A., Hussein, K.Q.	2009	HI students	General Science Topic	Video streaming (sign language and finger spelling), Image
Nasr, M.M.	2010	Deaf / HOH students	Chinese Sign Language	Virtual classroom, Interactive and social tools, Video conference, Chat rooms
Hastie, M., Dornan, D., Chen, N.S., Smith, R.	2011	HI children fitted with hearing technology	Language (listening and speaking)	Auditory-Verbal Therapy (A-VTs)
Debevc, M., Stjepanovic, Z., Holzinger, A.	2012	22 deaf and HOH people	Computer Literacy	Video streaming (sign language and subtitles), Animations

Brief explanations of each study

Generally, all the studies stated in Table 1 cover a wide range of educations or subjects taught for different types of hearing impaired students and how the approaches used to design the e-learning platform changed according to the needs, usability and adaptability of these special students. The study conducted by Drigas and Kouremenos (2005), concerned about a learning management system (LMS) which offered the Greek Sign Language videos for each text block in the learning environment. The system satisfied the deaf learners' needs by providing the bilingual information (text and sign language), high level of visualization and learning with peers through the video conferencing. Straetz, Kaibel, Raithel, Specht, Grote and Kramer (2005) implemented the same approaches as in Drigas and Kouremonous's (2005) study, plus the use of content template in order to convey the knowledge efficiently to the deaf students. An intensive research on e-learning content adaptation for deaf students has been studied by Bueno, Fernandez del Castillo, Garcia and Borrego (2007). The problems faced by deaf students when reading text are compiled and tested with several recommendations to adapt text in an e-learning Computing course which eventually showed a promising result on the level of understanding among those students.

Ng, Liew, Saripan and Abas (2007) have come out with friendly flexi e-learning system which enables both blind and deaf students to study together with the normal ones to support the "Education for All" objective. The system can assist the bidirectional communications among different kinds of students. Furthermore, there is also a research in Jordan where, this is the first time the centralized e-learning system for deaf ever implemented in that country and it focusing on how the ICT technologies can assists in bringing the interactivity to the deaf classroom (Khwaldeh, Matar & Hunaiti, 2007). Next, Al-Osaimi, AlFedaghi and Alsumait (2009) reported on some guidelines in designing e-learning programs for deaf children aged between seven to thirteen years old, which based on deaf children and their teachers' feedbacks. There is a need for these guidelines since the existing e-learning programs were not age-appropriate and cause difficulties for children to interact with.

Instead of focusing on the e-learning tools alone, Al-Bayati and Hussein (2009) have studied about the impact of e-learning modules of tutorial lessons for HI students towards their motivation in learning the subject. Seven experimental tutorial e-lessons were developed and tested which resulting in some positive outcomes towards enhancing HI students' motivation. Study done by Nasr (2010) revolved around enhancing the e-learning environment for deaf and HOH pupils by steering many learning facilities like interactive and social set of tools. The proposed paradigm is hoped to increase the usability and interactivity within virtual learning environment

for disabled users. Hastie, Dornan, Chen and Smith (2011) have taken the technology a step further by inventing an e-learning system which able to train children with cochlear implant to listen and speak, which in the end can lessen the role of trained and accredited Auditory-Verbal Therapist (A-VT) in teaching those children. Last but not least, Debevc, Stjepanovic and Holzinger (2012) have developed an adapted e-learning environment for people with disabilities. The usability and pedagogical effectiveness of the e-learning course are evaluated using a Software Usability Measurement Inventory and Adapted Pedagogical Index method.

Approaches

The needs, usability, and adaptability always take presidency every time a researcher wants to develop an appropriate e-learning platform for HI students to learn efficiently. The technologies and techniques used must in line with these three aspects and among the popular approaches used in all ten studies mentioned above are video streaming, chat rooms, video conference, text adaptation, and interactive and social tools.

The video streaming application is the core medium for knowledge transfer to happen, mainly by using the sign language. Hence, several specifications like the resolution, frame format, file format, and frame bit rate must be taken into account in ensuring the quality of the sign language video presented to the HI students are clear enough to be recognized by them (Khwaldeh et al., 2007). The accessibility of e-learning also found to be increased when spoken text and other sound information are presented together inside the video. Besides its potential in improving the reading skills among deaf students, it will also enable them to learn independently (Debevc et al., 2012).

An integrated communication component consisting of chat and video conference enables the HI students to communicate and involve in the collaborative task (Drigas & Kouremenos, 2005; Straetz et. al.; 2005). This is the medium where HI students can clarify their ideas and share information (Khwaldeh et al., 2007). The interface of the e-learning environment itself plays a vital role in shaping the contents to be easily understood by the HI students. A familiar and interactive yet effective interface of the e-learning environment could boost up the learning experience of the HI students hence their performance (Al-Osaimi et al., 2009). Straetz et al. (2005) used a designed templates block for different parts of each page included in their developed e-learning environment. The parts of the page are for example the header or the content layout. The template blocks used are fixed throughout the e-learning environment so that the users will be familiar with the environment

A knowledge database system is an approach proposed by Bueno et al. (2007) in their e-learning. Knowledge database can be described as a dictionary mainly focusing on translating any difficult terms to be understood by the HI students to the easier form to be understood by them. Finally, a rather unorthodox approach used by Hastie et al. (2011) by using an A-VT to be cooperated within an e-learning environment was found to be worked out well especially in terms of helping children who used to have knowledge of language they used to use during their lives before the loss of their hearing.

Limitations

There are several limitations allocated in terms of the usage of e-learning environment for HI students. First of all, it involves the teachers or instructors knowledge regarding the e-learning technology itself. During these modern times, most of them are probably adequate with the knowledge however there are several groups who might not acquire this kind of knowledge. Secondly, in terms of the necessary infrastructure needed in making sure the usage of e-learning environment for HI students to be succeeded as certain schools or institutions might not be enriched with the infrastructure needed in developing the e-learning environment. Finally, in terms of the users itself, the HI students would probably find it difficult to cope with a new learning environment since they are very used to the usage of conventional classroom learning environment. They will have to be taught first on how to use technology generally in their daily learning activities so that it can be effective.

Future Directions

The implementation of e-learning within the HI learning environment is hopefully to be broaden up by years not only in terms of the technology itself but also in terms of the awareness level of how this approach could be very effective and useful to the HI students generally. E-learning designers should be aware of the existence of the users with hearing impairment and will try to develop an e-learning environment which will be effective to both normal hearing users and hearing impaired users. Finally, the usage of technology for HI students in terms of learning should be widen up not only by using an e-learning environment but also other available technology that is seemed appropriate to be used according to their disability.

CONCLUSIONS

The usage of technology should be capitalized especially for educational purposes, not only for normal students but for the disabled students as well, particularly the HI students. Their difficulties in using the conventional learning method should be taken as an opportunity for the e-learning developers and researchers in helping them by creating a learning environment that could help them in a variety ways. The development of any e-learning environment should help them in boosting their motivation level and at the same time enhancing their performance in learning any subjects or courses available in schools or learning institutions.

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EMPLOYING MICROSOFT LIVE@EDU CLOUD PLATFORM TO ASSIST IN TEACHING CHINESE READING FOR JUNIOR HIGH SCHOOL STUDENTS

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ABSTRACT
This study aimed to investigate junior high school students' learning attitudes and learning effectiveness through administering Microsoft Live@edu to assist in teaching Chinese reading. Quasi-experimental approach was used and a total of 63 eighth grade students were divided into the experimental group (N=32) and control group (N=31). Descriptive statistics, paired t-test, one-sample t-test, multiple regression, and ANCOVA were used to analyze the collected data. The results of the study reveal that the students' reading attitude was enhanced in terms of cognition, affection, behavior, interaction, and reflection through using Microsoft Live@edu to assist in teaching Chinese reading. In terms of the reading learning effectiveness, the scores of the post-test are higher than the pre-test for both groups. The scores of the students in the experimental group are higher than of the control group. Finally, the students in the experimental group show greater progress in discussions and feedback and analysis of Chinese readings.

INTRODUCTION
In early December 2010, the PISA (Programme for International Student Assessment) reading assessment report was released; 15-year-old boys' reading literacy in Taiwan ranked the last among the three Chinese-Mandarin speaking countries and regions. This result not only alerts reading education in Taiwan but also drops a shocker showing the reading education between Taiwan junior high school students and International reading literacy has a massive gap. At the teaching site, the researchers observed that most of the students like surfing the Internet, the computer seems to have become an indispensable tool in the student's life. Thus, the researchers believe that if the Internet can be used to carry out the teaching of reading and enhance students reading motivation, attitude, and effectiveness, Internet will become the key of the auxiliary reading education. In order to explore the influence and effectiveness of implementing the online teaching platform on reading Instruction, the Microsoft Live@edu platform was used to assist in reading instruction, and PISA tests were used as teaching contents. Thus, the purposes of the study are to explore the teaching process of using Microsoft Live@edu platform, to analyze its influence on junior high school students' reading attitude and learning effectiveness and to compare the students' learning effectiveness of Microsoft Live@edu platform instruction and traditional reading instruction, as well as to investigate the relationship between learning attitude and learning effectiveness through using Microsoft Live@edu platform.

LITERATURE REVIEW
In 2006, the International Reading Literacy Study (progress in international reading literacy study, PIRLS) defined reading literacy as cultivating reading understanding and mastering written language ability, being able to construct meanings from a wide range of articles, learning from reading, participating in school reading community activities and obtaining joy from reading. Pan (2008) also proposed culture, creativity, and communication, as the 3 core values for reading. As a result, reading should enable students to read various types of materials, in accordance with the order of reading comprehension process and use their own life experiences to cultivate basic reading literacy and problem-solving skills, thereby enhancing their interest in reading and to build their own reading values.

Regarding studies on exploring reading learning attitudes and reading learning effectiveness, Brown (2011), Burrows (2012) and Rojas-Drummond (2012) found there was a significant increase on students' reading effectiveness through different reading instructions. Chang (2004) pointed out that attitude is an individual holds

a persistent and consistent behavior tendency toward people and things, including behavioral, emotional and cognitive tendency. Wigfield & Guthrie (1997) suggested that there was a link between reading attitude and reading motivation. Students' positive learning attitude can be increased through assisting them to obtain the sense of achievements and satisfaction of reading learning (Hsu, Hsu, &Wang, 2008).   Sun & Lin (2007) state that Internet learning is based on learning theory with emphasis on the use of information and communication technology, eliminating the learning time and space constraints, and providing learners situational teaching. Online learning can construct a digital scenario to improve learning motivation and effectiveness through autonomous learning, interactive and innovative learning, simulative learning, and accumulative learning. Therefore, internet-assisted instruction can provide students with vivid teaching contents, shared teaching resources, and various learning styles.

In our study, reading effectiveness refers to students can accurately understand the meanings of the articles and link their prior knowledge to generate additional understanding through reading teaching activities. Some previous studies indicate that students' reading learning effectiveness can be significantly enhanced through internet-assisted learning (Zorigian, 2009; Ismail et al, 2011; Ivory, 2011; Zaid, 2011). Thus, this study aims to explore the effects of integrating Microsoft Live@edu cloud platform with cooperative learning for assisting in teaching Chinese reading for junior high school students.

RESEARCH METHOD

This study adopts quasi-experimental design with purposive sampling. A total of 63 8th grade students participated in the study and were divided into the experimental group (n=32) and the control group (n=31). The Microsoft Live@edu cloud platform was used in the experimental group and traditional in-class reading instruction was used in the control group. The Reading Attitude Learning Scale contains cognitive, affective, behavioral, and overall domains. The learning satisfaction questionnaire contains teaching method, quality of learning, learning interaction, learning assessment, learning reflection, and overall performance.   The 5-point Likert scale was used in both scale and questionnaire. The content validity of the both scale and questionnaire were established by two experts in the related fields. PISA 2006 reading test questions were modified by the researchers and then used as the pre- and post-tests in this study. The content validity of the modified PISA reading tests was also verified by four senior Chinese teachers. Live@edu cloud platform provides learners an online space for storing and retrieving information and data freely through SkyDrive, Office, Messenger, Hotmail, and so on. The SkyDrive of Microsoft@edu cloud platform was used to conduct reading instruction in this study. Figure 1 shows the entry page of SkyDrive of Live@edu cloud platform.

Fig. 1 The entry page of SkyDrive of Live@edu cloud platform

Collected quantitative data were analyzed by descriptive statistics, one-sample t-test, paired sample t-test, multiple regression, and ANCOVA. Qualitative data includes teaching reflection, students' reflections, group discussions, and abstracts of reading assignments.

RESULTS AND DISCUSSION

The results of the pre-test and post-test scores of the experimental group analyzed by paired-sample t-test

reached the significant level, p=.000<.05, indicating the students of the experimental group have made significant progress on reading through the Live@edu cloud platform learning and instruction. In addition, the pre-test scores of the PISA reading test questions were treated as covariates, the post-test scores of the PISA reading test questions were treated as the dependent variable, and groups were treated as the independent variables in the ANOCVA. The results of ANCOVA show that the learning effectiveness of the experimental group is better than the control group (p=.027<.05), indicating Live@edu cloud platform can effectively provide the experimental group students a communication platform to share and discuss ideas, questions, thoughts, and reflections and thus to enhance their abilities in obtaining useful information to improve their reading effectiveness.

Table 1: Results of one-sample t test of the students' reading attitude scale

Domain	Test value=3		
	t	df	Sig. (two-tailed)
Cognitive	9.16***	31	.000
Affective	5.73***	31	.000
Behavioral	6.37***	31	.000
Overall	8.31***	31	.000

***p<.001

Table 1 shows the results of one-sample t test of the students' reading attitude scale. The four domains of the reading attitude scale obtained p=.000<.05, indicating the experimental group students have made a significant progress on cognitive, affective, behavioral, and overall performance.

Table 2: Results of one-sample t test of the students' learning satisfaction

Domain	Test value=3		
	t	df	Sig. (two-tailed)
Teaching Method	10.17***	31	.000
Quality of Learning	8.11***	31	.000
Learning Interaction	6.65***	31	.000
Learning Assessment	5.58***	31	.000
Learning Reflection	6.68***	31	.000
Overall performance	8.45***	31	.000

***p<.001

Table 2 shows the results of one-sample t test of the experimental group students' learning satisfaction for the five domains. All the five domains obtained p value of .000<.05, indicating the students have made a significant progress in areas of teaching method, quality of learning, learning interaction, learning assessment, learning reflection, and overall performance.

Table 3: Results of Pearson product-moment correlation coefficient on the four factors

	Learning Effectiveness of Reading	Reading Attitude
Reading Attitude	.473**	-
Learning Satisfaction	.435*	.649***

*p<.05   **p<.01   ***p<.001

Table 3 shows the results of Pearson product-moment correlation coefficient on the four factors of reading, including learning satisfaction, learning effectiveness of reading, and reading attitude. The results show that there are significantly positive correlations among reading attitude, learning satisfaction, and learning effectiveness of reading, suggesting that the higher the students' reading attitude, learning, the higher the learning effectiveness . Also, the results of multiple regression analysis show that reading attitude obtained positive value of β , indicating learning effectiveness of reading   can be positively predicted by the reading attitude.

Additionally, the results of teaching reflections show that there are more errors on the abstracts and contents of reflection writing in the early stage of the experiment. After providing writing guidance to the students, the students have made significant progress on both the abstract and content of reflection writing. After the three rounds of experimental teaching, the students' reading comprehension ability and effectiveness are significantly progressed through online reading learning. Finally, compared to the tradition reading instruction, the results of

Live@edu cloud platform learning show the students have learned more and learned efficiently through student-teacher discussions and interactions and peer feedback on the platform. The students also pointed out that their reading ability has been improved and the frequencies of interacting with classmates have been increased as well, indicating implementing the Live@edu cloud platform to reading instruction is interesting and successful.

CONCLUSIONS AND SUGGESTIONS
(1)Conclusion
The results of this study show that the students had significant progress on their reading scores through Live@edu cloud platform assisted learning, which is in accordance with findings of studies by Zorigian, 2009, Ismail, 2011, Ivory, 2011, and Zaid, 2011. Compared with the traditional instruction of Chinese reading, the students' learning effectiveness of the Live@edu cloud platform group is significantly higher than the traditional reading instruction group. In terms of reading learning attitude, the experimental group students show significant positive reading attitude and learning satisfaction after the experimental teaching. That is, Live@edu cloud platform assisted Chinese reading learning can effectively enhance the students' reading attitude and learning satisfaction. Additionally, the experimental group students show a significantly positive correlation between reading learning attitude and reading achievement, indicating the more positive the learning attitude, the higher the reading learning outcomes. Finally, the contents of the reading summaries of the students in the Live@edu cloud platform-assisted group are more substantial than the traditional teaching group.

(2)Suggestions
In order to reduce the instructor's teaching load, a reading teaching social network can be established to provide a forum for teaching related subjects discussion, modification, and thus to construct an ideal reading teaching model to enhance students' learning interest in Chinese reading. In addition, the instructor should strengthen the group discussions and feedback, so that the students can obtain feedback and suggestions to increase their reading comprehension. Finally, when errors of the Live@edu cloud platform occur, the instructor should make a quick report to Microsoft in Taiwan, so that network administrators can provide immediate assistance and to improve the function of the platform and thus the students can obtain better learning outcomes.

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EXPLORING ATTITUDES AND ACHIEVEMENT OF WEB-BASED HOMEWORK IN DEVELOPMENTAL ALGEBRA

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ABSTRACT
The purpose of this study was to understand how students' attitudes were connected to their mathematics learning. This investigation was specific to web-based homework in developmental courses in the community college environment. The mixed-methods approach was used to analyze the relationship between students' attitudes and mathematical achievement. The findings from the survey questionnaire showed mixed responses from the students on the benefits and disadvantages of the web-based homework. Cluster analysis results indicated the relationship between the three groups of students and their differences in mathematics attitude. The results suggest that students with lower and average mathematics achievement had a more positive in attitude towards using the web-based homework system compared to the high achieving students. Based on the results, it can be noted that web-based homework plays an important role in students' attitude possibly because of the immediate feedback that improves understanding

Keywords: Web-based homework; Mathematics attitude; Mathematics achievement; Developmental algebra

1. INTRODUCTION

Students who enrolled in college level mathematic courses seem unprepared to complete the courses especially college algebra (Hodges & Kennedy, 2004). This is based on their high school grades and college placement examination scores. Colleges help these underprepared students with the developmental or remedial mathematics courses. After completing these compulsory developmental courses with satisfactory grades, students are then allowed to enrolled in their college mathematics classes.

A study done by Hoyt and Sorensen (2001) , reported that between 30- 90% of in-coming college students require developmental mathematics classes before they begin college level mathematics classes. Even with extensive developmental mathematical courses, a large number of students were unable to succeed in college algebra by getting the D, W or F grades known as the DWF rate (Brewer, 2009). The average passing rate for college algebra in the United States is between 40- 50 % (Herriott, 2006).

To address this issue, reforms in college algebra should be given priority. Nonetheless, large scale reforms in these mathematics courses face difficulty as colleges and universities structure these programs based on certain theoretical and practical considerations (Baxter Hastings et. al., 2006). In most college algebra classes, the pedagogical framework are lectures given by instructors and homework assigned to students. If these effective pedagogical strategies can fit within the traditional lecture based classes, the college mathematics community would support this change (Brewer, 2009). This study intends to blend the intervention called web based homework within the traditional framework and explore students' attitudes and achievement in developmental algebra.

2. WEB-BASED HOMEWORK

Homework is assigned to students by instructors to be completed at home. This is particularly relevant in mathematics classes. Students require the opportunity to practice the skills they have just learned. Observing examples provided by instructors in mathematics classes are insufficient to help students acquire the necessary procedures in solving a mathematical question. Students require feedback from instructors after completing their homework. This step is important in knowing whether the students understanding is correct when solving problems. Students are then able to adjust their approach after realizing their errors from the feedback obtained. This is known in the mathematics education field as the attempt-feedback-reattempt cycle (Zerr, 2007).

However, at the college level some students do not attempt the homework problems given by their instructors. This causes the students to miss the opportunity to solve the homework questions on their own. Without this important component, students would not know the correctness of their solutions and obtain the necessary feedback from their instructors. In addition, some instructors might not be able to collect their students' homework and grade them due to time constraint (Brewer, 2009). Finally, even though the first attempt have been graded, students might not receive the feedback in a timely fashion and students fail to re-adjust their

understanding of the concept (Jacobson, 2006). In short, the students do not obtain the maximum benefits of completing the homework in an algebra class.

One way to improve the attempt-feedback-reattempt cycle in a traditional homework is by using the web-based homework. The web-based homework or online homework, in general refers to a system of computerized homework problems that is available online with the capability to automatically grade answers and provide immediate feedback on the correctness of the solutions (Jacobson, 2006; Kinney, 2001). In this study, the web-based homework used follows closely the aspect of this definition. The homework system contains similar questions that are available in an algebra textbook and also questions with different degree of difficulty. Questions vary in different forms of true or false, open ended questions, regular exercises and challenging questions. Completed solutions would be automatically graded by the homework system once the answers are submitted. Students have the option to save the answers and complete one whole section of an exercise before submitting them. To assist students having problems solving the homework, a few examples similar to the question asked are shown. This helps the student understand the steps involved in answering the questions. Short video lectures are also provided for students to revise the algebra concepts. The online homework system is able to generate similar questions of a particular concept from the large database of questions.

3. OBJECTIVES

The aim of this study was grounded in our goal to understand how students' attitudes are connected to their mathematics learning and performance. This investigation was specific to web-based homework in developmental courses (i.e. remedial) in the community college environment. Some of our initial questions, answered using mixed-methods, centred on gaining a better understanding of how mathematics attitudes of community college students impeded their progress in developmental mathematics courses (Author & Author, 2011). Findings from this study suggest that attitudes about web-based homework have significant implications on how students engage with and use web-based homework in online learning environments, thus the re-development of positive attitudes about mathematics at this late stage is essential.

Empirical and critical perspectives are applied in this research study based on factors surrounding lower income, immigrant, and racial/ethnic minority student success in community colleges. In general, students' difficult and often ill-equipped transition from high school to community college (Conley, 2007, 2010), especially lower-income students and urban students of colour (Roderick, Nagaoka, and Coca, 2009), positions them on a track for failure. With the advent of advanced web-based technology to track and aid students in mathematics, we are required to persistently investigate the usefulness of such platforms in developmental mathematics contexts. The present investigation was situated along three primary areas: (1) examining associations between attitudes and achievement, (2) understanding students' attitudes about web-based homework, and (3) increasing student outcomes. In a larger context, this study also seeks to add to discourses about developmental education in community colleges (Bailey, 2009).

The purpose of this study was to understand how students' attitudes are connected to their mathematics achievement. The study focuses specifically on the web-based homework in developmental algebra courses at the community college level. This study sought to answer the following research questions:
1.   What are the benefits and disadvantages of web-based homework programs in developmental algebra, specifically as they relate to student learning?
2.   What associations exist between students' attitudes and beliefs about web-based homework and their achievement in developmental algebra?

4. THEORETICAL PERSPECTIVES

The perspectives and ideas presented here allowed us to utilize former research as a means to contextualize and outline the modes of inquiry applied in this study. One additional goal of this study focused on continually challenging notions of "what works" in diverse mathematics classrooms and generating more active discussions about student experiences, their attitudes, behaviours, and their resulting achievement in developmental mathematics courses. Cooper (2007) noted that opinions about homework, not necessarily web-based homework, and the positive effects on their achievement were varied. Brewer & Becker (2010) conducted a quasi-experimental, post-test design study to examine the effectiveness of online homework (OHW) versus traditional-textbook based homework(THW). The results showed that low-skilled students who utilized OHW exhibited higher mathematical achievement that the low-skilled students who utilized THW.

Within the mission to advance the mathematics learning and increase mathematics achievement of lower income students and students of colour enrolled in community colleges (Zimmerman et al, 2011), more research focused on supporting beneficial and positive experiences is needed. Given that the use of web-based homework

platforms is becoming a standard practice in developmental algebra courses in community colleges, the research described in this study is both important and appropriate.

5. METHODOLOGY
This study used the mixed-methods research; phase 1 focused on quantitative component, phase 2 focused on qualitative component. A survey questionnaire was utilized to inform the researchers about the attitudes and beliefs of students on the web-based homework in the developmental algebra classes. The survey instrument consist of a 40 items questionnaire using a five point Likert scale. Items 1 to 15 focuses on mathematics beliefs, items 16 to 30 concentrates on attitudes towards web-based honework and items 31 to 40 couses on the usefulness of the web-based homework. Qualitative component (phase 2) asks for individual student thoughts about web-based platform from the open ended responses in the survey instrument.

To ensure the reliability of the survey questionnaire, a pilot test was conducted to obtain the reliability coefficient. The reliability coefficient method used was Cronbach's alpha. The Cronbach's alpha coefficient value of the survey items was 0.76.To answer the first reseach question, data from the open-ended responses in the survey instrument were analyzed. Students shared the benefits they obtained while using this web based homework system. The disadvantages of the homework system was also obtained from the students in the developmenal algebra classes.

For the second research question, quantitative methods such as cluster analysis and analysis of variance (ANOVA) were used to analyze the data. Cluster analysis identifies groups of samples that behave similarly or show similar characteristics. In this study, cluster analysis was used to explore the number of student groups from the sample. The ANOVA technique was used to determine whether there were any significant differences among the clusters. ANOVA investigated the relationship between students' mathematics attitudes and beliefs and mathematical achievements (as measured by a standardized examination). If the ANOVA analysis was significant among the clusters, the researcher also conducted a Tukey post-hoc test to determine where the differences existed.

Participants of this study are from a community college in an eastern state in the United States. Students are mostly Black and Latin. In this study, data was collected from 78 participants. The majority of the students are taking this mathematics course as a requirement for their graduation and usually as a pre-requisite for other courses. Most of the students are full time students but some of them work outside class time to pay for their college fees. Data collected from students in a developmental algebra course.

6. RESULTS
The first research question in this study states: What are the benefits and disadvantages of web-based homework programs in developmental algebra, specifically as they relate to student learning? The results from the survey questionnaire indicated mixed responses from the students on the benefits and disadvantages of the web-based homework. Students who liked the web-based homework generally mentioned the easy accessibility. In addition, the convenient of accessing the homework online and they could attempt the questions wherever they are. Some students preferred to attempt the questions late in the night or early in the morning depending on the available time. Many students mentioned that the instant feedback received from the homework system on the correctness of the answer was beneficial. The step by step solution provided for certain questions was very helpful in students finding their mistakes. This helps students who get frustrated easily when they are unable to spot the errors they made while attempting the question. One student even said that "This online homework system gave me a great study guide for questions and a way to work on them to perfection." A few students also praised the tab buttons in the homework system that was useful such as the "Practice It" and "Master It". Furthermore, what the students liked was the many features in the program that includes some video lectures and the how the program helped them in learning.

Some of the disadvantages mentioned by the respondents included the emphasis not on the working but just the final answer and how to get the right solution after trying a few times. The homework system only gives a feedback of right or wrong for most of the questions attempted. One common feature of this program that frustrate students especially when the error exists in their solution or when inputting mathematical symbols in the answer column. One student even mentioned about the difficulty of inserting the answers in the fraction form. Furthermore, the program does not provide sufficient feedback on what parts of the answer were incorrect in a specific problem. Citing one very specific example in the graphing of points, one student mentioned that the program is very rigid and does not let you plot the points easily.

Now we move on to the second research question: What associations exist between students' attitudes and beliefs about web-based homework and their achievement in developmental algebra? To answer this research question, quantitative methods that include cluster analysis and ANOVA was utilized. Cluster analysis results showed the relationship between the group of students and their mathematics attitude. From the analysis, there were 3 groups of students. Students in Cluster 1 rate survey items on attitudes and beliefs on the web based homework highly. Students in Cluster 2 and Cluster 3 had rated more items on attitudes and usefulness of web based homework system highly. Cluster 1 consists of 12 students. Cluster 2 had 29 students while Cluster 3 had 37 participants. The ANOVA analysis utilized the Tukey post-hoc test to compare the mean differences between the clusters. Using the Tukey post hoc test, the result showed that Cluster 1 students had high mathematics score, Cluster 2 students had average mathematics score while Cluster 3 students had a low mathematics score.

7. DISCUSSION AND CONCLUSION

This study investigates how students' attitudes are connected to their mathematics learning. Specifically, it examined learners' attitudes and beliefs on web-based homework in one developmental algebra course at the community college setting. It probed certain student demographics and whether the mathematics achievement had any relationship with the attitude towards the web-based homework tool. This study also explored the benefits and disadvantages of using the web based homework platform from the students' perspective in learning algebra.

The first research question comprised of the usefulness of the web based homework system. Results from the survey questionnaire showed mixed responses from the students on the benefits and disadvantages of the web-based homework. Students who liked the web-based homework generally mentioned the convenience, the many features in the program that includes some video lectures and the how the program helped them in learning. Some of the disadvantages mentioned including the emphasis not on the working but just the final answer, how to get the right solution after trying a few times and just getting a feedback of right or wrong.

The results suggest that students with lower and average mathematics achievement had a more positive in attitude towards using the web-based homework system compared to the high achieving students. These findings are similar with the notion that low-skilled students who obtains more benefits than high-performing students from the usage of web based homework (Wooten, 2013). Based on the results, it can be noted that web-based homework plays an important role in students' attitude possibly because of the immediate feedback that improves understanding.

This study provided some evidence that web-based homework such as Web Assign used in developmental algebra class maybe more beneficial to the students to receive immediate feedback through the automatic grading system. Furthermore, this study indicated that the use of the web-based homework provides more opportunities and motivates lower performing students in learning algebra. This is consistent with the findings of the study of the usage of the web-based homework in the first semester calculus class (Zeer, 2007).

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EXPLORING THE GAP BETWEEN A PRE- AND POST-INSTALLATION OF A CORPORATE E-LEARNING PROGRAM IN AN ACCOUNTING WORKPLACE

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ABSTRACT
Although earlier concentration has addressed the use of corporate e-learning programs (CELP), the dissimilitude between pre and post installation reaction to CELP is less explored. This study adopted a two-phase investigation to survey learner intention to use CELP and actual behavior within an international accounting firm. In the pre-installation phase, a survey was conducted to evaluate learner intention to use CELP, followed one year later by a second investigation to examine learner reactions to CELP and the actual usage frequency/ duration. The results of this study identified there is actually a difference between intention and actual usage duration. Further questionnaire surveys were implemented to identify learner reactions and factors that could potentially contribute to the gap between intention and actual usage duration. Results also indicated that scheduling was the critical factor leading to the differences in actual usage. The conclusions clarify the relationships among learner intention to use CELP, actual usage frequency/ duration, and subsequent reactions towards it.

INTRODUCTION
Among the many available forms of training media, e-learning has been widely adopted for obtaining skill-based organizational outcomes (Welsh, Wanberg, Brown, & Simmering, 2003; Zhang, 2004). Many financial institutions invest in e-learning programs to help their employees acquire knowledge regarding new services to better meet the diverse requirements of their customers (Luor, Hu, & Lu, 2009). A report published by Learning Circuits and E-learning News (2008) showed that corporate employees represent the majority (73.2%) of e-learning users. This figure highlights the attempts of businesses to develop their core competencies through low-cost, convenient, and flexible e-learning mechanisms. To aid in employee training, employers install and make e-learning programs available on the internet. Easy access to programs such as these can strengthen an institution's competitiveness, especially if the market in which the institution operates is highly competitive. In Taiwan, the accounting industry is facing just such competitive pressure in terms of service quality and administrative efficiency (Wu, 2008; Cheng, 2011). Researchers have noted that Taiwan has a high-performing society that encourages employees to improve their performance and rewards them for excellence (Javidan & House, 2001; Luor, Lu, Johanson, & Wu, 2009).

Like any training program, corporate e-learning programs (CELPs) encounter the difficulties of attracting, satisfying learners and keeping them engaged until the completion of the program (Noe, 2002; Wang & Wang, 2004; Lee, Tseng, Liu, & Liu, 2007). As with the success of any organizational policy, success in implementing CELP depends largely on employee participation (Wang & Wang, 2004). If learners perceive that courses are optional or have little positive effect on learners, lower completion rates are a likely result (Welsh *et al*., 2003). By analyzing learner reactions to CELP, executives can determine whether the learners accept the program; in other words, learner comments regarding the program can help to improve future implementation (Weibel, Stricker, & Wissmath, 2012). It is also important that CELP directors are aware of both favorable and unfavorable reactions to ensure that factors contributing to the success or failure of training activities are revealed (Stricker, Weibel, & Wissmath, 2011). To capture the entire spectrum of CELP, this study adopted both formative and summative approaches to examine learner reactions to CELP before and after installation of the program separately (Mohr, 1995; Luor *et al*., 2009) For the formative evaluation, a questionnaire was adopted to analyze the processes of the program (Mohr, 1995). For the summative evaluation, another questionnaire was developed to concern a program's effect on the development of knowledge and skills (Kirkpatrick, 1996; Luor *et al*., 2009).

Previous research has provided evidence that learners in an e-learning environment outperform their counterparts in traditional learning settings (Shachar & Neumann, 2010; Stricker *et al*., 2011; Weibel *et al*., 2012). In addition, Luor et al. (2009) further proposed a gap between the learner intention and actual usage of CELP. However, few studies have explored how different factors influence the actual behavior to CELP within the contextual relation of a   practical workplace at the same time. In short, this study had two goals. First, a framework was developed and tested based on the variables of intention to use CELP (INT), actual usage freqency (AUF), actual usage duration (AUD), perception of utility (UT), satisfaction (SAT) and affective reaction to e-learning (AR). This frame was used to provide a better understanding of how learner intention influences the actual usage of CELP and helped to identify the rationale behind the observed relationships.

Second, doubts have been raised as to whether a gap actually exists between INT, AUF, and AUD. Moreover, a further questionnaire survey was conducted to find out the critical factors that may contribute to this gap.

METHOD
Hypothesis
INT and AUF/ AUD
Based on the theory of reasoned action (TRA; Fishbein & Ajzen, 1975) and the theory of planned behavior (TPB; Ajzen, 1991), learner intention to participate in a specific behavior derives from their attitude to that behavior. A lot of studies have proposed the relationship between intention and behavior (Kim & Hunter, 1993; Luor *et al*., 2009). These theories suppose that actual behavior draws from intention to use (Fishbein & Ajzen, 1975, Ajzen, 1991, Taylor & Todd, 1995). Both TRA and TPB regard intention as the precedent of actual behavior. That is, only learners with intentions toward a particular behavior are likely to follow through. In the contextual relation of CELP, learner INT is positively related to actual usage (AU). AU in this study adopted two methods for calculation: (1) learner log-in frequency (AUF); and (2) learner review duration (AUD). According to TRA and TPB, the following hypothesis was proposed.

> Hypothesis 1: Learner INT is positively related to learner AUF, such that the higher the learner INT, the higher the learner AUF.
> Hypothesis 2: Learner INT is positively related to learner AUD, such that the higher the learner INT, the longer the learner AUD.

AUF/ AUD , UT, SAT, and AR
Four criteria are commonly thought as proper for training evaluation: reactions, learning, behavior, and results (Kirkpatrick, 1959 & 1996; Luor *et al*., 2009). Moreover, reaction is the most frequently measured consequence in practice among them (Brown, 2005). Reaction is defined as how learners perceive a CELP, including the learning content and structure, learning strategies, facilitated design, information and interface design, and learning assessment and feedback in this study. Evaluating a CELP in terms of learner reaction is the same as measuring trainee feelings (Kirkpatrick, 1996). From the viewpoints of CELP designers, reactions are effective because they authorize organizations to evaluate learner satisfaction towards program. This evaluation may in turn help the organization to determine the courses to offer and the instructors to appoint. In measuring learner reaction, this study adopted the three types of reactions proposed by Brown (2005) and Luor *et al*. (2009): UT, SAT and AR. UT refers to the degree to which learners feel the CELP is useful (Brown, 2005; Luor *et al*., 2009). Learners with high UT tend to use what they learned at work and suggest the CELP to their colleagues (Orvis, Fisher, & Wasserman, 2009). SAT directs to the degree to which learners are satisfied with the environment in which corporate e-learning courses are delivered (Brown, 2005; Liaw, Huang, & Chen, 2007). Even though this point is not directly related to the content of the CELP, it plays an important role because technical problems can reduce the likelihood that learners will participate in e-learning (Luor *et al*., 2009). AR refers to the general affective feeling that learners have toward the CELP (Brown, 2005; Luor *et al*., 2009). This type of reaction can often affect the retention of CELP. Thus, the following hypotheses were proposed.

> Hypothesis 3: Learner AUF is positively related to learner UT, such that the higher the learner AUF, the higher the learner UT.
> Hypothesis 4: Learner AUD is positively related to learner UT, such that the longer the learner AUD, the higher the learner UT.
> Hypothesis 5: Learner AUF is positively related to learner SAT, such that the higher the learner AUF, the higher the learner SAT.
> Hypothesis 6: Learner AUD is positively related to learner SAT, such that the longer the learner AUD, the higher the learner SAT.
> Hypothesis 7: Learner AUF is positively related to learner AR, such that the higher the learner AUF, the higher the learner AR.
> Hypothesis 8: Learner AUD is positively related to learner AR, such that the longer the learner AUD, the higher the learner AR.

Participants
The participants were employees at an international accounting firm in Taiwan. This firm is among the top four accounting firms in Taiwan. A total of 330 Level I employees from the auditing department participated in this study. The CELP comprised four e-courses, including pre-audit meeting, audit practice I, audit practice II, and post-audit review. The four e-courses were designed and developed with the cooperation of this firm and the researcher, using the ADDIE method.

Measures

This study explored learner intention and actual usage to CELP before and after the installation of this program separately. To achieve this objective, this study measured participant intention to use CELP (INT), utility (UT), actual satisfaction (SAT), and affective reaction (AR) to CELP on the basis of items from the scale by Fishbein & Ajzen (1975) and Brown (2005). All items were measured on a 5-point Likert scale ranging from 1 to 5 (strongly disagree to strongly agree). The items used in this study and the reliability coefficients of each construct are shown in Table 1. All items were adopted from well-developed scales that have been used extensively in previous studies (Cacioppo & Petty, 1984; Fishbein & Ajzen, 1975). Because the reliability coefficients exceeded .70 and because the proposed relationships among the study variables were consistent with the relationships indicated by previous research (Schmidt & Hunter, 1996; Luor *et al*., 2009), the psychometric properties of the items in this study should be acceptable (Kim & Hunter, 1993; Schmidt & Hunter, 1996).

To ensure the content validity of the scale (Schmidt & Hunter, 1996), ten individuals participated in the pre-test according to Cheng (2011). Five participants were employees with experience in e-leaning at the firm in the case study. Each item in the questionnaire was evaluated using a three-point Likert scale, including A as "Unclear question", B as "Needed modification", and C as "Clear question". Usually, the items that had an A-point were deleted, the items that had a B-point were revised, and the items that had a C-point were kept for the questionnaire. The five other participants included three experts in accounting and two experts in e-learning. Each item in the questionnaire was also assessed using a three-point Likert scale, with 1 as "It is not necessary to ask the question", 2 as "It is useful, but not essential to ask the question", and 3 as "It is essential to ask the question". The questions that received a one-point score were deleted, the questions that received a two-point score were revised, and the questions that received a three-point score were kept in this study.

Table 1. Measurement and Reliability

Measurement items		Cronbach's α
1.Intention towards corporate e-learning (INT)		
	I was intent on using the corporate e-learning program.	
2.Utility (UT)		
	Using e-learning was relevant to my work.	0.915
	Using e-learning provided useful skill and knowledge.	
3.Technology satisfaction (SAT)		
	The e-learning interface was easy to use.	0.907
	The e-learning allowed for easy review.	
	I am satisfied with the e-learning interface.	
4.Affective reaction (AR)		
	I enjoyed using e-learning.	0.949
	With e-learning, this material was fun.	
	I am satisfied with e-learning.	
	I will recommend e-learning to others.	

Procedures

Prior to installation of the CELP, employee intention to use CELP was surveyed. The questionnaire measured employee perceptions of INT with regard to CELP. Of the 330 questionnaires distributed during Sep-Nov 2010, 312 valid responses were obtained. A second survey to evaluate employee reactions to the CELP was conducted one year after installation. Of the 312 employees who had played a part in the pre-installation survey, only 178 employees had actually used the CELP. Thus, the response rate was 57.05% in the post-installation survey. Table 2 presents the demographic background of the 178 participants.

To determine whether a gap really exists between INT and AU in the accounting industry, this study defined high-intention participants as those whose score on the intention scale was larger than the mean score of 3.7. Consequently, 104 employees that had used the CELP were identified as high- intention participants. A

median-split method was then used to divide high-intention participants into two groups on the basis of their AUD. AUD was evaluated according to time that participants reviewed CELP (median AUD=95 minutes). 53 employees were in the high-intention and high-usage group (HH group) and the remaining 51 employees were in the high-intention and low-usage group (HL group). Moreover, a measure of the nine identified critical success factors was developed on the basis of factors critical to e-learning obtained from the previous literature (Alexander, 2001; Bonk, 2001; Soong, Chan, Chua, & Loh, 2001; Masoumi, 2006; Packham *et al.*, 2004; Welsh *et al.*, 2003 ; Féraud, 2005; Luor *et al.*, 2009). 104 questionnaires were then distributed to all high-INT employees on the spot, resulting in a response rate of 100%.

Table 2. Demographic background of participants

Item	Group	Persons	%
Gender	Male	40	22.5%
	Female	138	77.5%
	Total	178	100%
Age	20 ~ 24	129	72.5%
	25 ~ 29	44	24.7%
	30 ~ 34	5	2.8%
	Total	178	100%
Education	Bachelors	131	73.6%
	Masters	47	26.4%
	Total	178	100%
Possession of professional certificate(s)	Yes	7	3.9%
	No	171	96.1%
	Total	178	100%
Note: Of the 7 respondents with professional certificate(s), 1 reported to have both a Taiwan CPA license and a US CPA license, 3 reported to have a Taiwan CPA license, and 3 reported to have a US CPA license.			

Analysis
This study adopted path analysis with regression to analyze the data. In general, the coefficient value that is correlated with each path represents the power of each linear relationship.

RESULTS
Regression Approach Results
As shown in Table 3, most correlations among variables were less than 0.8, indicating that there was no chance of multicollinearity among the variables in this study (Kettanurak, Ramamurthy, & Haseman, 2001). Table 3 presents the descriptive statistics of variables in this study. The INT statistics had a high mean value (3.7), which implies that the participants generally had a positive intention to use CELP. The bivariate relationships showed that all significant correlations were less than 0.80, except for the correlation between SAT and AR ($r = 0.836$, $p < 0.01$). The following relationships that held after the installation of the CELP are significant: INT is correlated with AUF, and AUF is correlated with AUD. However, the relationship between INT and AUD is not significant. Specifically, neither learner AUF nor AUD is positively related to learner UT ($\beta = 0.005$, $p > 0.05$; $\beta = 0.003$, $p > 0.05$), to SAT ($\beta = 0.064$, $p > 0.05$; $\beta = 0.07$, $p > 0.05$) and to AR ($\beta = 0.044$, $p > 0.05$; $\beta = 0.001$, $p > 0.05$). In a word, no matter AUF or AUD is not correlated with UT, SAT, or AR. In addition, the relationship between INT and AUD is not significant. In other words, the regression results supported Hypothesis 1 but not Hypotheses 2 to 8. The research model is shown in Fig.1.

Table 3. Mean, Standard Deviation, and Correlation among Study Variables

	1	2	3	4	5	6
Before system installation						
INT-AVG	3.70(.825)	.122**	.077	.490***	.552***	.588***
Actual usage						
AUF		9.89(8.492)	.731***	.005	.064	.044
AUD			298.8(451.05)	.003	.007	.001
UT-AVG				4.02(.67)	.723***	.642***
SAT-AVG					3.824(.717)	.836***
AR-AVG						3.639(.739)

Mean (standard deviation) is shown on the diagonal.

** Correlation is significant at the .05 level (2-tailed); *** Correlation is significant at the .01 level (2-tailed).

INT, intention; AUF, learner log-in frequency; AUD, learner review duration by minutes; UT, utility; SAT, satisfaction; AR, affective reaction to e-learning.
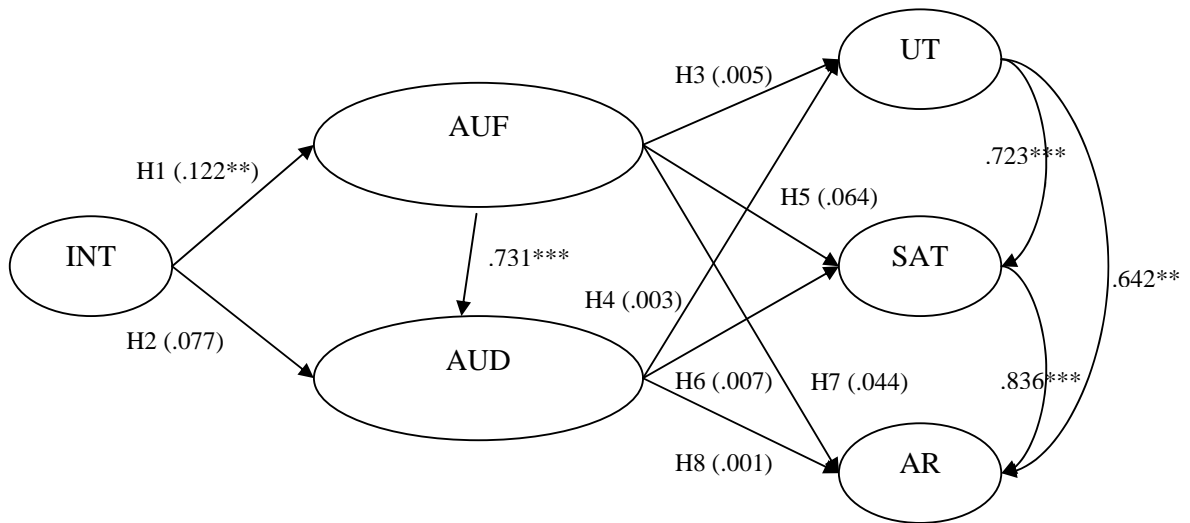
Fig. 1. Research Model

Note: ** Correlation is significant at the .05 level (2-tailed); *** Correlation is significant at the .01 level (2-tailed).

Formative Evaluation of CELP

Although learner AU is not correlated with UT, SAT, or AR, this study further adopted a questionnaire to explore learner opinions of CELP for formative evaluation. Hereafter, the high mean values of learner response were added up to report the results. Table 4 illustrates that most of the learners had a positive attitude toward CELP, in terms of learning content and structure, learning strategies, facilitated design, information and interface design, learning assessment, and feedback. It could be inferred that CELP increased learner motivation to engage in the program. However, actual usage did not cultivate in accordance with their positive attitudes toward the CELP. The reason may be that (1) learners did not have sufficient time to use CELP, or (2) learners were accustomed to the conventional knowledge delivery model in an actual classroom. Radical changes in the knowledge delivery model through technology may result in employee resistance to learning (Wang, 2009).

Table 4. Formative Evaluation of CELP

Dimension	Item	N	SA	A	N	D	SD	M
Learning content and structure	1-1. The content of CELP clearly describes the topics I am to learn.	178	36 (20%)	109 (61%)	30 (17%)	2 (1%)	1 (1%)	3.99
	1-2. The content of CELP clearly explains what knowledge I can acquire.	178	39 (22%)	105 (59%)	29 (16%)	5 (3%)	0 (0%)	4.00
	1-3. The content of CELP clearly describes what skills I can acquire.	178	33 (19%)	107 (60%)	32 (18%)	6 (3%)	0 (0%)	3.94
	1-4. The content of CELP clearly explains what kind of work attitude I should have.	178	38 (21%)	96 (54%)	34 (19%)	10 (6%)	0 (0%)	3.91
	1-5. The content of CELP completely conforms to the instructional goals.	178	31 (17%)	107 (60%)	34 (19%)	5 (3%)	1 (1%)	3.91
	1-6. The content of CELP is suitable for me.	178	32 (18%)	101 (57%)	39 (22%)	6 (3%)	0 (0%)	3.89
	1-7. The content of CELP is correct.	178	30 (17%)	97 (54%)	42 (24%)	8 (4%)	1 (1%)	3.83
	1-8. The content of CELP is well organized in an appropriate order.	178	33 (18%)	107 (60%)	30 (17%)	7 (4%)	1 (1%)	3.92
	1-9. The content of CELP is well organized in a process that meets my needs.	178	35 (20%)	108 (60%)	26 (15%)	8 (4%)	1 (1%)	3.94
	1-10. The content of CELP is well organized in each unit.	178	33 (18%)	105 (59%)	34 (19%)	5 (3%)	1 (1%)	3.92
	1-11. The content of CELP provides adequate materials in each unit.	178	32 (18%)	101 (56%)	37 (21%)	7 (4%)	1 (1%)	3.88
	1-12. The content of CELP clearly explains what kinds of prerequisite skills I should possess.	178	27 (15%)	99 (56%)	44 (25%)	8 (4%)	0 (0%)	3.81
	1-13. CELP offers supplementary learning resources.	178	37 (21%)	96 (53%)	37 (21%)	8 (5%)	0 (0%)	3.91
	Learning content and structure	3.91						
Learning strategies	2-1. CELP inspires learning motivation.	178	26 (15%)	91 (51%)	50 (28%)	10 (5%)	1 (1%)	3.74
	2-2. CELP offers adequate examples and demonstrations.	178	41 (23%)	99 (56%)	31 (17%)	6 (3%)	1 (1%)	3.97
	2-3. CELP is presented in a way that meets learner needs.	178	35 (20%)	102 (57%)	33 (18%)	7 (4%)	1 (1%)	3.92
	2-4. CELP provides explanations in each stage of learning.	178	39 (22%)	100 (56%)	33 (18%)	5 (3%)	1 (1%)	3.96
	Learning strategies	3.90						
Facilitated design	3-1. CELP provides a helpful user manual.	178	25 (14%)	102 (57%)	38 (21%)	12 (7%)	1 (1%)	3.78
	3-2. CELP inspires me to participate in learning activities.	178	29 (16%)	95 (53%)	46 (26%)	7 (4%)	1 (1%)	3.81
	3-3. CELP clearly shows what I have accomplished.	178	26 (15%)	101 (56%)	40 (22%)	10 (6%)	1 (1%)	3.79
	3-4. CELP offers adequate facilitated functions (such as	178	28 (16%)	104 (58%)	39 (22%)	5 (3%)	2 (1%)	3.85

	FAQ).						
	Facilitated design				3.81		
Information and interface design	4-1. The materials of CELP are clear.	178	38 (21%)	103 (58%)	30 (17%)	6 (3%)	1 (1%)	3.96
	4-2. The materials of CELP are good.	178	28 (16%)	101 (57%)	38 (21%)	10 (5%)	1 (1%)	3.81
	4-3. Multimedia of CELP enhances my interest in learning.	178	32 (17%)	83 (47%)	53 (30%)	8 (5%)	2 (1%)	3.76
	4-4. Multimedia of CELP facilitates my understanding of the materials.	178	32 (18%)	101 (57%)	38 (21%)	6 (3%)	1 (1%)	3.88
	4-5. Multimedia of CELP has been adequately used to support instruction.	178	29 (16%)	98 (55%)	45 (25%)	5 (3%)	1 (1%)	3.84
	4-6. The interface of CELP has an appropriate appearance.	178	34 (19%)	90 (51%)	46 (26%)	6 (3%)	2 (1%)	3.83
	4-7. The interface of CELP has appropriate content.	178	33 (19%)	90 (51%)	46 (26%)	8 (5%)	1 (1%)	3.82
	4-8. The interface of CELP has appropriate colors.	178	32 (18%)	84 (47%)	52 (29%)	9 (5%)	1 (1%)	3.77
	4-9. The interface has appropriately designed functions.	178	27 (15%)	86 (48%)	58 (33%)	6 (3%)	1 (1%)	3.74
	4-10. The interface of CELP has an appropriate layout.	178	30 (17%)	91 (51%)	50 (28%)	6 (3%)	1 (1%)	3.80
	4-11. Multimedia of CELP is convenient to use.	178	31 (17%)	91 (51%)	49 (28%)	6 (3%)	1 (1%)	3.81
	4-12. Multimedia of CELP is designed in a consistent way.	178	31 (17%)	97 (55%)	41 (23%)	8 (4%)	1 (1%)	3.84
	4-13. The browser tool is easy to recognize.	178	38 (21%)	91 (51%)	45 (25%)	3 (2%)	1 (1%)	3.91
	4-14. The browser tool is easy to operate.	178	43 (24%)	88 (49%)	41 (23%)	5 (3%)	1 (1%)	3.94
	4-15. I can select units to learn by myself.	178	51 (28%)	77 (43%)	41 (23%)	8 (5%)	1 (1%)	3.95
	4-16. I can adjust my learning pace and schedule by myself.	178	48 (27%)	79 (44%)	41 (23%)	8 (5%)	2 (1%)	3.92
	Interface design				3.86		
Learning assessment and feedback	5-1. CELP offers adequate opportunities for practice.	178	34 (19%)	96 (54%)	40 (22%)	7 (4%)	1 (1%)	3.87
	5-2. CELP allows me to understand my learning progress and outcomes.	178	31 (17%)	101 (57%)	37 (21%)	8 (4%)	1 (1%)	3.86
	5-3. The practice activities of CELP conform to the instructional goals.	178	36 (20%)	99 (55%)	37 (21%)	5 (3%)	1 (1%)	3.92
	5-4. CELP provides adequate problems for learning assessment.	178	28 (15%)	100 (56%)	37 (21%)	12 (7%)	1 (1%)	3.80
	5-5. CELP provides sufficient feedback.	178	30 (17%)	93 (52%)	39 (22%)	15 (8%)	1 (1%)	3.76
	Learning assessment and feedback				3.84		
Total					3.88		

Factors Causing the Gap between Intention to Use CELP and Actual Usage

Previous studies have identified many critical factors that may influence a learner's decision to withdraw from e-learning, including retention, motivation, and satisfaction (Alexander, 2001; Bonk, 2001; Packham *et al*., 2004; Luor *et al*., 2009). In this study, despite the strong intentions of learners to use CELP, low actual usage of

CELP still commonly occurred. It is suggested that factors important to the success of CELP within an environment can be grouped into four categories: IT, instructor, learner, and institution support (Selim, 2007; Luor *et al.*, 2009). The nine factors summarized in this study may contribute to the difference between intention and actual usage: (1) motivation: motivation is important to future usage (Alexander, 2001; Bonk, 2001); (2) intimidation: learners are less likely to use e-learning spontaneously when intimidation appears (Soong *et al.*, 2001); (3) enjoyment: enjoyment is related with learner intention to use e-learning (Soong et al., 2001; Luor *et al.*, 2009); (4) scheduling: scheduling is important to whether or not learners can use e-learning (Masoumi, 2006); (5) usefulness: job-relevance and the usefulness of course content seem to be critical incentives for learners (Welsh *et al.*, 2003) ; (6) technical problems: technical problems can detract from learner actual usage of e-learning (Packham *et al.*, 2004; Féraud, 2005; Luor *et al.*, 2009); (7) problem-solving abilities: improving problem-solving is the key to motivate learner usage of e-learning (Masoumi, 2006); (8) performance: expecting improvements in performance can influence the future usage of CELP (Soong et al., 2001; Masoumi, 2006); and (9) management support: management support is the key to learner usage of e-learning (Féraud, 2005; Luor *et al.*, 2009).

A nine-item scale was used to determine whether the HH group and the HL group differed in their perceptions of the nine factors causing the gap between INT and AUD. Each item was also measured using a 5-point Likert-type scale ranging from 1 to 5 (strongly disagree to strongly agree). The results show that the two groups differed with regard to scheduling, as in Table 5. It can be inferred that scheduling is the critical factor influencing actual usage duration. Moreover, scheduling is the most likely reason not to support the proposed relationships among AUD/AUF, UT, SAT, and AR.

Table 5. Descriptive data and t-test between HH group and HL group

Factors	HH	HL	t-value
Motivation (The firm encourages me to use CELP)	3.76 (.52)	3.72 (.83)	1.81
Intimidation (I feel intimidated to use CELP)	1.95 (.63)	1.98 (.92)	-1.73
Enjoyment (I enjoy using CELP)	3.70 (.67)	3.67 (.58)	1.72
Scheduling (I have adequate time to use CELP)	3.85 (.97)	2.97 (.75)	2.94**
Usefulness (CELP provides me useful courses)	4.15 (.87)	3.98 (.76)	1.84
Technical problems (I have technical problems to use CELP)	2.43 (.57)	2.41 (.61)	1.73
Problem-solving abilities (Using CELP can improve my problem-solving abilities)	3.69 (.68)	3.72 (.52)	1.75
Performance (Using CELP can improve my performance)	3.86 (.52)	3.84 (.67)	1.65
Management Support (I use CELP because of management support)	3.46 (.72)	3.42 (.75)	1.71

** $p < .05$

DISCUSSION

Based on the related literature, the proposed framework of learner intention, actual usage, utility, satisfaction, and affective reaction to CELP was examined. The results confirm some of the proposed hypotheses but deny most of them. The findings in this study demonstrate that learner intention to use CELP (INT) is positively related to log-in frequency (AUF). On the other hand, surprisingly, INT is not related to learner review duration (AUD), suggesting that there is really a gap between INT and AUD. Based on the literature review and questionnaire conducted in this study, one critical factor leads to this gap: scheduling, which was also proposed by Masoumi (2006). It is known that the higher the learner intention to use CELP, the more frequently learners will log in. However, due to scheduling difficulties, learners do not always have adequate time to review the content of CELP. The issue of scheduling mirrors many possible barriers that may stop employees from using CELP. In response to this topic, this study agrees with the opinion of Hwang, Chang and Chen (2004) to block some periods for study to ensure employees have enough time to use CELP in the practical workplace. Another possible solution to this problem is to have employees participate in CELP at home. Furthermore, it is known that only learners who have good scheduling skills frequently spend time using CELPs and benefit from them.

Another surprising finding is that actual usage of CELP is not positively related to UT, SAT or AR, regardless of AUF or AUD, suggesting that when employees try to use CELP, they generally do not have a positive reaction to the CELP. However, according to the formative evaluation of CELP by learners conducted in this study, the percentage of strongly agree and agree adequately explained that most of the learners had a positive attitude toward CELP for learning content and structure, learning strategies, facilitated design, information and interface design, learning assessment and aspects of feedback. A reasonable inference may be that many learners do not have adequate time to carefully review the CELP. In this case, they seldom had specific attitudes or reactions to CELP. In summary, the findings in this study echo those in previous studies, such that only when learners have both motivation and necessary e-learning abilities will they recognize the implementation of CELP as a positive change (Stricker et al., 2011). In addition, based on the formative evaluation of CELP, it can be inferred that CELP increases learner motivation to engage in the program. This suggests that CELP constitutes an organizational intervention that is worthy of promotion.

The variables adopted in this study were based on the previous literature (Fishbein & Ajzen, 1975; Ajzen, 1991; Brown, 2005; Liaw, Huang, & Chen, 2007; Luor et al., 2009; Stricker et al., 2011; Weibel et al., 2012). Previous research has provided evidence that learners in an e-learning setting outperform their counterparts in traditional learning environments (Shachar & Neumann, 2010; Weibel et al., 2011; Stricker et al., 2011). However, few studies have explored how different factors influence actual usage and reactions to CELP in the practical workplace.The present study developed and tested the framework of INT, AUF, AUD, UT, SAT and AR in the accounting industry. This study verified the argument again proposed by Luor et al. (2009) that a gap actually exists between learner intention and actual usage. In addition, the study further finds out that the learner INT is correlated with AUF, suggesting that learner intention to CELP is positively related to their log-in frequency. A follow-up survey also indicates that scheduling is the critical factor leading to differences in AUD in the accounting industry. Future researchers would be suggested to look for other factors to forecast the behavior of learner intention and following behavior. Furthermore, future researchers should determine whether other variables, such as goal orientation and organization atmosphere (Luor et al., 2009; Orvis et al., 2009), destroy the relationships among INT, AUD, UT, SAT, and AR.

Finally, this study has some limitations. The results may be of somewhat limited with regard to external validity because the participants comprised the employees of an accounting firm in Taiwan. One must keep in mind that the relationship of learner intention, and their log-in frequency was limited to Taiwan-based participants; thus, readers should be aware of geographic limits. Moreover, additional analysis for other e-learning courses should be conducted to draw conclusions regarding the framework proposed in this study. Finally, the performance of participants, such as achievements using training material, has not been evaluated yet; however, efforts are currently underway to obtain this kind of "hard" data in follow up study.

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INVESTIGATION OF VOCATIONAL HIGH-SCHOOL STUDENTS' COMPUTER ANXIETY

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ABSTRACT
With the advent of the computer technologies, we are increasingly encountering these technologies in every field of life. The fact that the computer technology is so much interwoven with the daily life makes it necessary to investigate certain psychological attitudes of those working with computers towards computers. As this study is limited to the impact of technology on education, anxiety, out of certain psychological attitudes, was investigated within it. The investigation was on the vocational high-school students' computer-related anxiety, and as a data collection instrument, the Computer Anxiety Scale was used. The Computer Anxiety Scale was conducted on 265 students receiving education at various departments in the Tunceli Vocational School of Tunceli University. It was observed as a result that gender is a variable that did not make any meaningful difference for the computer anxiety, while the type of education received, grade, receiving computer education and having a computer may mean meaningful differences in terms of various sub-factors and the whole scale itself. It is necessary to determine the level of computer anxiety, and keep it under control while receiving computer education or while learning with computers.
Keywords: Undergraduate study, Computer anxiety, learning with computers, Vocational High-school students

INTRODUCTION
With the advent of the computer technologies, we are increasingly encountering these technologies in every field of life. The fact that the computer technology is so much interwoven with the daily life makes it necessary to investigate certain psychological attitudes of those working with computers towards computers. One of these psychological attitudes is computer anxiety. Howard and Smith (1986) define the computer anxiety as "*the tendency of a person to experience a level of uneasiness over his or her impending use of a computer*". According to another definition, computer anxiety is a behavior of avoiding interaction with the information processors (Weinberg, 1983). According to Cambre and Cook (1985), computer anxiety is a result of forcing to social change emerging from the rapid nature of the new technology.

In the relevant literature, the anxiety is mentioned together with such behaviors as keeping off computers, abstaining from computers and computer phobias. The computer anxiety is classified as a special kind of anxiety, and such various types of it as sense of frustration, possibility of shame, disappointment and experiencing fear of obscurity are mentioned (Orr, 2009). Moreover, such findings as that the computer anxiety leads to decrease in success and in effort for success (Phelps and Ellis, 2009) seem to have been obtained. Keen (1998) mentions the existence of a social dimension for the computer anxiety, and states that such expressions during learning as "*you cannot do it*", "*you cannot be successful*" are effective on the computer anxiety. Saade and Kira (2009) emphasize that feelings like disappointment, frustration, worry, etc. will affect not only the interaction with computers but also productivity, learning social relations and individual welfare in general. In addition, Çakıroğlu (2009) dwells on the computer anxiety in terms of human physiology, and claims that the computer anxiety has some symptoms like sweating, dampening of hands, stomachache, difficulty in breathing or feeling of suffocation, palpitation and strain of lips. Other than the computer anxiety, frustration, regret, disappointment and feeling of panic are said to be other affective hinders that computer instructors encounter (Burkett, Compton and Burkett, 2001). The studies done by the following names can be given as examples for computer anxiety Gordon (1995), Burkett (1993), Tobias (1979), Bohlin (1999), Agbatogun (2010), Mahar, Henderson and Deane (1997), Sam, Othman and Nordin (2005), Beckers, Wicherts and Schmidt (2007), Maloumiyan, Akbari and Rastegar (2011) and Olatoye (2009).

All of the above-mentioned research findings clearly show that the computer anxiety should be taken into account in learning activities conducted with computers. In this study, the computer anxiety was dealt with in terms of the students of Vocational school. Thus, the general aim of the study can said to be the investigation of the Vocational school students' computer anxiety. In accordance with this aim, the Vocational school students' opinions about the computer anxiety were compared in terms of such variables as gender, type of education received, grade, experience of computer education and having a computer.

METHOD

The design of this study can said to be a survey model. As Karasar (2009:76) puts it, it is aimed to describe past or present situations in the survey model. The survey model is resorted to in the case of larger samples differently from other research designs (Büyüköztürk et al., 2008:177).

The sample of the study consists of 265 students receiving education at various departments of the Tunceli Vocational School of Tunceli University. 200 of these students are females (75.5 %), and 65 of them are males (24.5 %). 160 of the students are in the first year (60.5 %), while 105 of them (39.5 %) are in the second year of their study. The students are from 7 different programs. The ages of the students range from 16 to 28, and the age mean is 22.13.

The data collection instrument used in the study is the Computer Anxiety Scale developed by Heinssen, Glass and Knight (1987), and adapted by Tuncer (2012). As a result of the adaptation of the scale, it was observed that the scale is made up of 13 items and three dimensions. Altogether with this three-factor structure of the scale, 56.045 % of the total variance is explained. The scale is made up of these three factors: anxiety due to lack of learning, anxiety due to fear of making mistakes and uncertainty-based anxiety. The Cronbach's alpha coefficient for the whole scale is .75.

FINDINGS

The student's opinions gathered with the application of the Computer Anxiety Scale were compared in terms of such variables as gender, type of education received, grade, experience of computer education and having a computer. The independent groups t-test results of the students' opinions about the computer anxiety in terms of gender variable are given in Table 1 below.

Table 1. Comparison of the Opinions about Computer Anxiety in terms of Gender

Dimension	Gender	n	$\bar{X}$	SS	Levene's test F	p	df	T test T	p
Anxiety due to lack of learning	Female	200	4,02	,85	1,433	,232	263	1,068	,286
	Male	65	3,90	,80					
Anxiety due to fear of making mistakes	Female	200	2,87	1,09	,105	,746	263	-,789	,431
	Male	65	2,99	1,07					
Uncertainty-based anxiety	Female	200	3,09	,93	,359	,550	263	-,685	,494
	Male	65	3,18	,92					
The Whole Scale	Female	200	3,45	,62	,774	,380	263	,005	,996
	Male	65	3,45	,56					

As it is seen in Table 1, the opinions about the computer anxiety were compared in terms of the gender variable, and no meaningful difference was observed in any dimension of the scale and in the whole scale itself.

Another variable that was investigated within the study is the type of education received. There are two groups of students in this regard: the students attending school in daytime (Normal education) and those ones, which entered the school with relatively lower exam-marks, attending school in the evening (Evening education). The results of the independent groups t-test, by which the students' opinions were compared, and of the Mann Whitney U test, which is resorted to when the distribution is not homogenous, are summarized in Table 2 below.

Table 2. Comparison of the Opinions about Computer Anxiety in terms of the Type of Education

Dimension	Education type	n	$\bar{X}$	SS	Levene's test F	p	df	T test t	p
Anxiety due to lack of learning	Normal ed.	172	4,10	,77	5,311	,022*	263	U=6931,50	p=,008*
	Evening ed	93	3,79	,92					
Anxiety due to fear of making mistakes	Normal ed.	172	2,90	1,09	,000	,988	263	,032	,972
	Evening ed	93	2,89	1,07					
Uncertainty-based anxiety	Normal ed.	172	3,12	,89	,948	,331	263	,031	,975
	Evening ed	93	3,11	,99					
The Whole Scale	Normal ed.	172	3,50	,55	5,684	,018*	263	U=7790,00	p= ,205
	Evening ed	93	3,36	,69					

*p<.05

According to Table 2, there is only a meaningful difference of opinions, in terms of the education type, in the "anxiety due to lack of learning" factor of the scale in favor of the students of normal education (U=6931.50, p<.05). No other meaningful differences were observed in other dimensions of the scale in terms of the education type variable.

The grade of study was determined to be another variable that should be investigated within this research study. For, it was aimed to investigate the state of computer anxiety of both those who had just started receiving undergraduate study and taking information technologies courses, and those who would be graduated in a short time with a relatively more informed mind in this sense. The results of the independent groups t-test which compares these students' opinions about the computer anxiety in terms of the grade variable are given in Table 3 below.

Table 3. Comparison of the Opinions about Computer Anxiety in terms of Grade

Dimension	Grade	n	$\overline{X}$	SS	Levene's test			T test	
					F	p	df	t	p
Anxiety due to lack of learning	1st Year	160	4,07	,811	,778	,379	263	1,818	,070
	2nd Year	105	3,88	,871					
Anxiety due to fear of making mistakes	1st Year	160	2,98	1,05	,927	,336	263	1,453	,147
	2nd Year	105	2,78	1,12					
Uncertainty-based anxiety	1st Year	160	3,00	,88	,994	,320	263	-2,447	,015*
	2nd Year	105	3,28	,97					
The Whole Scale	1st Year	160	3,49	,61	,003	,956	263	1,091	,276
	2nd Year	105	3,40	,61					

As a result of the analyses, there is only a meaningful difference of opinions in the "uncertainty-based anxiety" dimension of the scale in favor of the second-year students (t(263)=-2,447, p<.05). No other meaningful differences were observed in other dimensions of the scale in this regard.

There were also comparisons of those students who had somehow received computer education before and those who had never received any computer education before. Thus, it was thought that there could be an answer for the question "Does having a knowledge of computers affect the computer anxiety?". In the analyses done in this sense, it was observed that there is only a meaningful difference of opinions in the "anxiety due to fear of making mistakes" factor of the scale in favor of those who had not received any computer education before (t(263)= -2,752, p<.05). The results of this analysis are given in Table 4 below.

Table 4. Comparison of the Opinions about Computer Anxiety in terms of Experience of Computer Education

Have you received any computer education?		n	$\overline{X}$	SS	Levene's test			T test	
					F	p	df	t	p
Anxiety due to fear of making mistakes	Yes	140	2,75	1,11	1,688	,195	263	-2,752	,006*
	No	125	3,11	1,01					

The last variable whose effect was investigated within the study is the case of having a computer. The computer anxiety-related opinions of those who have a computer and those who do not have any were compared and summarized in Table 5 below.

Table 5. Comparison of the Opinions about Computer Anxiety in terms of having a Computer

Do you have a computer?		n	$\overline{X}$	SS	Levene's test			T test	
					F	p	df	t	p
Anxiety due to fear of making mistakes	Yes	107	2,58	1,06	,170	,681	263	-3,919	,000*
	No	158	3,10	1,05					
The whole Scale	Yes	107	3,40	,49	8,621	,004*		U=7588,500	
	No	158	3,49	,67				P=,035*	

The analyses show that there are meaningful differences of opinions in the "anxiety due to fear of making mistakes" dimension of the scale (t(263)=-3,919, p<.05) and in the whole scale itself (U=7588,500, p<.05) in favor of those who do not have a computer.

DISCUSSION

On evaluating the overall findings of the study, it was identified that gender is a variable that did not make any meaningful difference for the computer anxiety, while the other variables may mean meaningful differences in terms of various sub-factors and the whole scale itself. This finding regarding gender is opposite to the findings of the study carried out by Chen (1986). Chen (1986) concludes that males have more positive attitudes towards computers than females, and they have less computer anxiety. This find was also obtained by Çelik (2007) and Meral, Cambaz and Zerayak (2001). On the other hand, Loyd, Loyd and Gressard (1987), Başarmak (2008) and Yılmaz and Eşgi (2011) claim something totally opposite to this idea. Rosen, Sears and Weil (1987), Tuncer (2010), Başarmak and Güyer (2009) and Badagliacco (1990) conclude in parallel with this research that gender is not effective on the computer anxiety.

Upon the comparisons in terms of the grade variable, a meaningful difference was found on behalf of the second-year students in the "uncertainty-based anxiety" dimension of the computer anxiety scale; whereas Tuncer (2010) concludes that there is no any meaningful difference in terms of the computer anxiety according to the grade variable.

Another find of the study is that having experience of computer education is effective on the computer anxiety. There is a meaningful difference of opinions on behalf of those having not received any computer education in the "anxiety due to fear of making mistakes" factor of the scale. According to Chua, Chen and Wong (1999), Harris and Davison (1999), Computer training courses or computer education reduce the computer anxiety temporarily. However, according to Gos (1996), Safford and Worthington (1999), the computer anxiety increases with the increase of skills in this sense. Accordingly, Yılmaz and Eşgi (2011) identified in their study on educational supervisors that the computer anxiety of the supervisors having taken the educational technology course is higher than of those having not taken the course. According to Arıkan (2002) and Akkuş (2004) the computer anxiety decreases with the increase of computer experience. Başarmak and Güyer (2009) found, among the computer anxiety levels of pre-service teachers, a meaningful difference in favour of those having not taken a computer course.

Learning in this sense is negatively affected with the increase in such anxieties as failure to accomplish the learning task, encountering bad situations, inability to achieve the objectives (Başaran 2005: 411). Therefore, while receiving computer education or learning with computers, to determine the level of the computer anxiety and to keep it under control will enhance learning productivity. The researches in the relevant literature concentrate on the fact that with the increase of computer skills, computer anxiety will increase as well. Therefore, the fact that computer users are informed about computer anxiety could help to reduce possible problems they may have during the process. As the computer technology will always evolve, there will always be anxiety of computers or anxiety of the unknown in the general sense. Thus, the technology users should be educated with this conscious.

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LEADERSHIP STYLES IN SYNCHRONOUS AND ASYNCHRONOUS VIRTUAL LEARNING ENVIRONMENTS

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ABSTRACT
A comparison of the effects of transactional and transformational leadership in synchronous and a synchronous online teamwork was conducted. In the study, groups of four participants interacted in online text chat and online text forum in problem solving tasks. The groups were leaded by a confederate who acted as a transactional or a transformational leader. Satisfaction in the interactions and participations communicative styles were assessed. Results indicated that transformational leadership is more satisfying and cognitive and metacognitive style oriented than transactional leadership that is more participative style oriented.
Keywords: transactional leadership, transformational leadership, online teamwork, satisfaction, cognitive style

With the advent of new media technologies and the recent advances in networking environments and telecommunications, many researchers have improved their study to the proliferations of teams that do not work face-to-face, but interact over a computer-mediated-communication network.

One of the most important characteristics of groups that discuss in virtual and direct interactions is leadership. In the last twenty years research has increasingly focused on leadership in work groups. The growing amount of research on interaction in face-to-face contexts does not correspond to a similar increase in research on groups interacting with computer-mediated-communication.

LEADERSHIP IN COMPUTER-MEDIATED-GROUPS

Zigurs (2003) maintains that virtual groups afford us a unique opportunity to redefine leadership. According to the traditional model, leaders are supposed to offer encouragement, reward, and motivation – mostly through their physical presence or comments – and reinforce the development of relations inside the group. A virtual environment makes it necessary to revise some aspects of leadership, partly due to the fact that interaction now takes place with a machine. One of the fundamental characteristics of this new context is the *recognizability* of the leader's status. In face-to-face interactions, leadership indicators involve body language, vocal inflection, eye contact, clothing, etc., which in a computer-mediated-communication can be difficult to detect. Consistent with the media richness theory (Daft & Lengel, 1984), the medium forces the leader to adopt other indicators to let followers know he/she is in charge, which include frequency of intervention, small delays between request and responses, being (almost) always available.

Among the approaches to the study of leadership that accurately describe the complexity of the changes under way in our society and in modern organizational contexts, one of the best known is the transformational/transactional framework (Bass, 1985, 1990, 1997).

In this perspective, the leader is the person who not only adapts to various situations, but is also able to transform the reference context. Bass (1990) discusses the difference between a transactional leadership model, in which the leader emerges as the result of transactions and exchanges with group members, whereas a transformational leader is a person willing to adapt to the changes and instability of situations and is also able to involve, motivate, and support collaborators in a manner consistent with the required transformations. The transformational style goes beyond the exchange of incentives and corrective transactions between leaders and subordinates and pushes collaborators out of the individual dimension so as to privilege the group, the mission, and the vision, focusing on long-term objectives and attempting to change existing situations. For Bass (1997) a leader can embody both types and constitute a model of leadership that moves along a continuum ranging from a transactional to a transformational style.

The transactional leadership model considers leaders "negotiating agents" who conciliate and sometimes compromise in order to obtain greater decision-making power within the group. To achieve this goal, leaders perform a series of actions that enable them to influence and convince those individuals who are capable of providing valuable support. Their activity consists in implementing interpersonal transactions in which tasks, expectations, and related awards are indicated and clarified. Followers are motivated by the opportunity to obtain the personal rewards that only the leader can grant, and prefer to replicate behaviors that have been successful and discard unproductive ones (Bass & Riggio, 2006).

Transactional leadership is based on two factors: contingent reward and management-by-exception. The leader administers positive reinforcement, awards, praise, and rewards when pre-determined goals are achieved; he utilizes negative reinforcement like punishment, reprimands, and negative feedback when mistakes and violations or failures occur (Bass & Riggio, 2006). In any case, rewards and punishments aim to ensure that the expected results are achieved and not at a transformation of the followers (Boal & Hooijberg, 2007).

The operational mode of a transformational leader brings individuals to seek rewards within themselves, favoring the personal growth of individuals and groups, as well as their self-awareness (Scaffidi Abbate & Ruggieri, 2008, 2011) According to Boal and Hooiberg (2007), while the transactional leader exploits interest that already exists in a group, the transformational leader tries to change the value system of each individual in order to construct a new one based on common goals. He/she actively engages with followers, obtaining their collaboration and encouraging them to identify with a vision of the job that goes beyond their immediate individual interests.

A way has thus been found to transcend the exchange of incentives and corrective transactions between leaders and followers – indeed, it is a way to amplify interests and raise consensus and awareness of the group's goals. People are encouraged to abandon their individual dimension in order to enhance the group and the organization, concentrating on long-term goals and attempting to change existing situations. This is accomplished by a leader who accompanies his collaborators, acting as a guide and motivator within a process of change and growth.

In general, research focusing on the effectiveness of transactional and transformational leadership within the context of virtual teams is relatively scarce (Hambey, O'Neill & Kline, 2007; Ji & Chuang, 2012).

In virtual teams transactional and transformational leaders are likely to play a vital role in facilitating the attainment of goals by providing structures, motivating and engaging team members, and attending to socio-emotional aspects of the team (Huang, Kahai & Jestice, 2010). By facilitating certain processes, these leaders introduce changes in followers' behaviors and in the way they interact with one another, thereby changing the capabilities of a team. Past research supports this view (Sosik, Avolio & Kahai, 2010), suggesting that transactional and transformational leadership in virtual teams can overcome process-based losses, thereby improving team creativity and strategies. The facilitation enabled by transactional and transformational leadership styles is likely to be more effective when a virtual team faces more challenging situations (Avolio, Kahai & Dodge, 2000; Joshi, Lazarova & Liao, 2009; Purvanova & Bono, 2009).

Moreover, virtual team research based on situational perspectives of leadership suggests that transformational leadership becomes more effective than transactional leadership in situations involving anonymity. Within these groups, transformational leaders are able to establish higher levels of trust, performance and job satisfaction compared to those of transactional leadership, but that the average level of satisfaction is lower than in face-to-face conditions (Hoyt & Blascovich, 2003; Ruggieri, 2009).

In summary, transactional and transformational leaders are expected to play a greater ''process facilitation" role in virtual teams than established practices for face-to-face teams (Huang, Kahai & Jestice, 2009) .

COMMUNICATION STYLES IN VIRTUAL TEAMS
According to media synchronicity theory (Dennis & Valacich, 1999), there are two types of communication characterizing virtual team interaction: synchronous and asynchronous.

In synchronous interactions team members communicate in real time, such as through teleconferencing, videoconferencing or chat. Synchronous communication media allow individuals to work on the same task, with the same information, at the same time (Baker, 2002). In asynchronous interactions team members communicate

at different times, to solve a problem, to play a game or to join a project. The most used media are e-mail or online text forum and threaded discussions.

Comparing several communication media with each other will help increase our understanding of the technologies that allow virtual teams to collaborate most effectively (Baltes, Dickson, Sherman, Bauer & LaGanke, 2002).

Although in recent years there is a growing interest in the use of video (i.e. videoconferencing), the majority of studies that have examined computer-mediated-communication have used text-based systems. Particularly, online text chat and online text forum are the most common media used. A suggested benefit of this type of text-based interaction is that it may allow for more reflection and the ability to choose one's words more carefully than in face-to-face or telephone communication (Wolfe, 2002). Online text-based communication can also allow team members to more efficiently share ideas in brainstorming tasks because everyone can speak at once, thereby minimizing process losses (Griffith & Neale, 2001). Additionally, text-based communication may neutralize the tendency for increased relational conflict often observed in dissimilar groups, because these differences are less salient (Mannix, Griffith & Neale, 2002). Conversation in this medium, however, has also been criticized for lacking focus because multiple group members may be speaking at the same time (synchronous interaction) or overcommunicate (asynchronous interaction). Also, different rates of typing and reading can lead to more or less delayed responses by individuals within the group discussion, and could result in low contributions by some members who could otherwise improve the team's performance (Hambley, O'Neil & Kline, 2007).

In studies of computer conferencing there is a relatively little use of content analysis technique compared to other techniques such as surveys, interviews, participant observation and computer generated statistical manipulations. In the past, the most common methods for assessing the content and outcomes of online forums have been limited to frequency counts, message maps showing numbers of replies and message chains, and other similar quantitative measures. One notable exception to this was Henri's (1992) work, arguably one of the most influential and sophisticated cognitive analysis models for online interaction. Henri was a pioneer in utilizing content analysis to analyze the transcripts of discussions, in order to evaluate the quality of online learning communities. Influenced by this, researchers have been prompted to take up more challenging methods of content analysis in order to answer crucial questions related to social negotiation of meaning in computer-mediated-communication. Content analysis provides an opportunity to reach a better understanding of learning in a computer-mediated-communication environment since it can help to clarify the students' cognitive processes and ways of handling information during studies.

In Henri's (1992) model, a central concept in view of the content analysis instrument is interactivity. The definition of interactivity is borrowed from Bretz (1983), who states that interactivity is a three-step process: (1) communication of information, (2) a first response to this information, and (3) a second answer relating to the first. Her instrument to analyze the transcripts of discussions is based on a cognitivist approach to learning; although she also refers to particular concepts, such as learning in a cooperative mode and to the concept of collective knowledge.

Henri's analytical framework consists of five dimensions of the learning process that can be found in online text messages. Her work has laid the foundation for subsequent research. Particularly, Henri developed a quantitative approach which analyzed messages into units of meaning and attempted to measure social dimensions, interactivity, cognitive skills, levels of processing and metacognitive knowledge and skills.

The participative dimension comprises two categories: (1) overall participation, which is the total number of messages and accesses to the discussion and (2) the active participation in the learning process, which is the number of statements directly related to learning made by learners and educators. As she believes that messages of unequal length cannot serve as precise measures of active participation, she proposes to divide messages into statements corresponding to units of meaning.

The social dimension comprises all statements or part of statements not related to the formal content of the subject matter. This operationalization is derived from the model of Berger, Pezdek and Banks (1987) that states that social presence is at work in any statement not related to the formal content of the subject matter.

The interactive dimension is first divided in two parts: interactive versus non-interactive (independent) statements. Secondly, the interactive statements can be further subdivided into explicit versus implicit interactions. Furthermore, two different types of interactive messages are distinguished: responses and commentaries. This leads to five categories, namely (1) direct (explicit) responses, (2) direct (explicit)

commentaries, (3) indirect (implicit) responses, (4) indirect (implicit) commentaries, and (5) independent statements (Wever, Schellens, Valcke, & Van Keer, 2006).

The cognitive dimension consists out of five categories: (1) elementary clarification: observing or studying a problem identifying its elements, and observing their linkages in order to come to a basic understanding, (2) in-depth clarification: analyzing and understanding a problem which sheds light on the values, beliefs, and assumptions which underlie the statement of the problem, (3) inference: induction and deduction, admitting or proposing an idea on the basis of its link with propositions already admitted as true, (4) judgment: making decisions, statements, appreciations, and criticisms, and (5) strategies: proposing coordinated actions for the application of a solution, or following through on a choice or a decision. Furthermore, surface processing is distinguished from in-depth processing, in order to evaluate the skills identified (Wever, Schellens, Valcke, & Van Keer, 2006).

The metacognitive dimensions comprise metacognitive knowledge and metacognitive skills. Metacognitive knowledge is declarative knowledge concerning the person, the task, and the strategies. Metacognitive skills refer to ''procedural knowledge relating to evaluation, planning, regulation, and self-awareness'' (Henri, 1992, p. 131). Henri does notice however that although the messages can reveal useful information, it is impossible to reveal the totality of the metacognitive processes. This means that ''even if no metacognitive activity was noticed, one could not conclude that the students are weak in this area'' (Henri, 1992, p. 133).

THE RESEARCH

The aims of the present research project was to analyze if and how leadership style and communication medium used, interact with the followers communication style. As mentioned above, the status of group leader is definitely less recognizable in computer-mediated-groups due to the difficulty in the use of implicit indexes of status such as vocal inflection or eyes contact. The medium force the leader to adopt other indicators to let followers know about his/her being in charge: frequency of intervention, small delay between request and responses, being (almost) always available etc. This difference in leader's behavioral style may result in different ingroup dynamics which, in turn, may affect followers' interaction styles and satisfaction. Moreover, these possible difference may vary according to leadership style. In particular, transformational leaders are expected to be more effective in enhancing cognitive and metacognitive styles and job satisfaction.

Participants and design
Ninety-six Web user (51 males and 45 females) took part in this study. Participants' age ranged between 18 and 46 years (mean = 28.6; s.d. = 3.4). They were all enrolled, on a voluntary basis, from face-to-face and online friends, and explicit request in online communities, from two undergraduate students.

The participants were randomly assigned in a two conditions of a 2 (interaction mode: online text chat vs. online text forum) X 2 (management style of the group: transactional vs. transformational) mixed between-within participants design.

Procedure
The experiment was presented as problem solving activity. Specifically, the participants were given the task to a solve a brain teaser in online virtual groups that had to be solved in five days.

The groups use a Computer Supported Collaborative Work (CSCW) context using text chat (for those interacting in synchronous mode) or a forum (for those with asynchronous interaction).

Each group consisted of four participants and one senior expert – the confederate – who directed the group's activity. Every participant took part in two different conditions. On the whole, there were 48 groups composed of four participants plus the senior expert who acted as leader, who did not suggest the solutions, but who helped the groups to find itself. In one half of the groups, the senior expert was instructed to act as a transactional leader, and in the other half as a transformational leader. Instructions were created by following Mindgarden's (2000) Multifactor Leadership Questionnaire and its scales and subscales. Senior experts did not know the real aims of the research.

All activities of the groups (online chat and forum) were recorded. After completing the task, job satisfaction was assessed via self-report questionnaire.

Instruments

Content analysis. The content of the online chat and web-forums was coded according to Henri's (1992) framework. The messages were divided into "message units" for analysis. A message unit can be divided "by words, by a group of words, by proposition, by sentence, or by paragraph" (Henri, 1992, p. 134). Henri also notes that an objective determination of the unit of meaning is difficult to make. In the present study it turned out that message units tended to correspond to paragraphs, as this is the way that written communication is organized. This kind of analysis is considered more effective in analyzing discussion where a message often answers more than a question or presents more phases of the same contribution. Leader's message were excluded from the present analysis.

Job satisfaction. This was measured using the Satisfaction with Job - General (Dubinsky & Hartley, 1996; Italian version translated, validated and adapted by Barbaranelli, Bortone and Di Matteo, 2010), on a seven-point scale (from "very unsatisfied" to "very satisfied"), and specifically, five questions aimed at evidencing a person's level of satisfaction with respect to a performed task.

Results

Manipulation check. In all, 4515 units were coded. Two researcher, independently each other, coded all the messages. The coding reflected a middle-good agreement (for the five dimensions, 0.62<Cohen's k<0.74).

The analysis of univariate effects revealed the existence of significant differences between the effects of transactional and transformational leadership in four of five dimensions of Henri's model. Specifically, it was observed that relating to participative dimension, no differences were observed (p=n.s.). Transactional leaders conditions create higher score in social and interactive dimensions than transformational leaders (social: $F(1,4515)=24.23$; $p<.01$; interactive: $F(1,4515)=22.11$; $p<.01$). Differences also can be found in cognitive and metacognive dimensions. Indeed, transformational leaders generate more messages in this dimensions than transactional leaders (cognitive: $F(1,4515)=18.56$; $p<.01$; metacognitive: $F(1,4515)=19.17$; $p<.01$).

As regards to interaction mode, online text chat and online text forum, no differences were observed in participative dimension (p=n.s.). More messages in social and interactive dimensions were observed in online text chat than in online text forum (social: $F(1,4515)=54.14$; $p<.01$; interactive: $F(1,4515)=15.06$; $p<.01$). On the other hand, more messages in cognitive and metacognitive dimensions were observed in online text forum than in online text chat (cognitive: $F(1,4515)=27.32$; $p<.01$; metacognitive: $F(1,4515)=46.08$; $p<.01$).

No interaction effects emerge between leadership style and media in all five dimensions (p=n.s.).

Job satisfaction was analyzed in the two interaction conditions and the existence of a main effect was found ($F(1,96)=17.3$; $p<.01$), ascribable to an higher level in chat than in forum condition. It was also observed that individuals in situations of transformational leadership possess higher levels of satisfaction with respect to the performed task ($F(1,96)=12.4$; $p<.01$).

DISCUSSION AND CONCLUSION

On the whole, these results enlighten a coherent scenario of the functioning of leadership in virtual teams and on the communicative styles which leaders evoke, examining the nature of online interactivity in problem solving processes. Interaction is one of the most important components of any learning experience and it is a crucial concept in online problem solving and education. The approach used, based on Henri's (1992) model of analysis, offered insights to understanding how the online leaders addressed discussions in online context. As Lally (2001, p. 401) points out: "One of the major strengths of Henri's approach to content analysis using categories is that it focuses on the social activity and the interactivity of individuals in a group at the same time as giving a picture of the cognitive and metacognitive processes of those individuals. However, one of its major limitations is that it gives no impression of the social co-construction of knowledge by the group of individuals as a group, in a discussion or a seminar". Although the instrument has been criticized (i.e. Pena-Shaff & Nicholls, 2004), it can be considered as pioneering work and has been the base for subsequent research.

A particularly interesting result concerns the distinction between transactional and transformational leadership. As shown by this study, working in an on-line group on the Web and being led by a leader who seeks the transformation of individual motivations (rather than a simple transaction involving resources) induces an increased level of cognitive and metacognitive communications.

The transformational leader is able to produce behavior that promotes individual potential and inspires an optimistic vision of the future that is oriented towards longer-term goals. These characteristics enable him to

provide his group with incentives for self-aware thinking: being aware of one's own thoughts ensures that behavior truly useful for personal growth is adopted. Reinforcing forms of higher-level reasoning thus helps individuals to become more aware of their own untapped capabilities and offers continuous intellectual stimulus, encouraging people to do more than what they expected of themselves in the beginning; all this enhances levels of proactive personality and team identification.

Job satisfaction results are also consistent with what was postulated by Bass (1990) and confirmed by subsequent research on interaction via Web (Hoyt & Blascovich, 2003; Ruggieri, 2009), that is, that a primary characteristic of the transformational leader is his interest in satisfaction and, in particular, the job satisfaction of his co-workers, which also entails holding in high consideration their individual skills and aspirations. The transformational leader has thus the ability to influence the emotional climate of the work group, generating an effect on the job satisfaction of each individual collaborator. McColl-Kennedy and Anderson (2002) maintain that these leaders have a positive impact on the optimistic vision of their followers and also create a pleasant general emotional state in relation to the job itself.

Results show also how the choice of interactive tools for virtual exchanges has a fundamental role in guiding communication within virtual contexts. These media are not however used in a "neutral" and transparent way, but rather are instruments to which communication must adapt; they are therefore able to generate their own domains and relations that are not necessarily analogous to those that occur in face-to-face interaction.

These findings have significant consequences for groups that interact on the Web. Providing incentives for adopting specific models of leadership and media in virtual work groups represents in fact the first step towards creating motivated and effective groups. It follows that a worker who is more satisfied and aware of his own resources can guarantee greater personal success and, consequently, better results for the organization.

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MOODLE: A WAY FOR BLENDING VLE AND FACE-TO-FACE INSTRUCTION IN THE ELT CONTEXT?

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ABSTRACT
This classroom research explores the probable consequences of a blended Teaching English to Young Learners (TEYLs) course comprised of Moodle applications and face to face instruction in the English Language Teaching (ELT) context. Contrary to previous face to face only procedure, the course was divided into two segments: traditional classroom instruction where lectures and discussions on how to teach English to young learners were held and the Moodle application where students uploaded their micro-teaching sessions and discussed and criticised one another's work online. This blended course was also thought to be a potential aid to save time in overcrowded classes. The procedure was designed in a manner that time to be devoted to micro-teaching sessions in the classroom was expected to be saved and left room for classroom discussions. To gather data, a student readiness scale, a questionnaire eliciting student teachers' views about the experience and, to bring more depth to the study, semi- structured interviews were used. The results reveal that a blended young learner course has various positive contributions other than time management for the instructor as well as on behalf of the course attendants.

INTRODUCTION
In this age we have been living, we inevitably benefit from the advantages of technology in every field of life including education. As institutions struggle hard to provide a constantly increasing number of people with training or education, use of CD ROMs, interactive computer programmes, web based or online learning, distance education, e-learning programmes and the like have gained more and more value. As a consequence of scrutinizing the pros and cons of the variety of these means of education and virtual learning environments, new doors were opened for newer conceivable innovations such as blending face-to-face and online education. Moreover, over the past decade web-based Virtual Learning Environments (VLE, also known as Course Management Systems, CMS) have become a standard part of teaching and learning provision in further and higher education. To begin with, defining a virtual learning environment may contribute well to the discussion of the study.

According to the definition of Techterms, a VLE is a virtual classroom that allows teachers and students to communicate with each other. Class information, learning materials, and assignments are typically provided via the Web. Students can log in the class website to view this information and may also download assignments and required reading materials to their computers. Some VLEs even allow assignments and tests to be completed online.

Similarly, Wikipedia defines a VLE (or a learning platform) as "an education system based on the web that models conventional real-world education by providing equivalent virtual access to classes, class content, tests, homework, grades, assessments, and other external resources such as academic or museum links. It is also a social space where students and teacher interact through threaded discussions or chat. It typically uses Web 2.0 tools for two-way interaction, and includes a content management system" (pa.1).

On the other hand, Dillenbourg, Schneider and Synteta (2002) write about a virtual learning environment as not referring to any educational web site, and not being restricted to systems including some 3D virtual reality technology. According to them, a "virtual learning environment" is not a synonymous to a "virtual campus". However, it provides university courses, while the name "virtual learning environment" does not restrict the scope to any age or level. In other words, a virtual learning environment is a designed information space for all. It is a social space; educational interactions occur in the environment, turning spaces into places. The virtual space is explicitly represented; the representation of this information/social space can vary from text to 3D immersive worlds. Students are not only active, but also actors; they co-construct the virtual space. These environments are not restricted to distance education; they also enrich classroom activities and integrate heterogeneous technologies and multiple pedagogical approaches. Finally, they point out that most virtual environments overlap with physical environments.

Nowadays, such systems as VLE or CMS are now also increasingly to be found in secondary schools and even primary schools. "These tools provide a wide range of features for supporting teaching and learning, from

simple document sharing to enabling online discussions and assessments and integration with institutional information systems" (Livingstone and Kemp, 2008, p. 59).

A growing body of research in the field of virtual learning environments concerns the consequences of using VLE tools in teaching and learning (Ilin, 2006 ; Inozu & Ilin, 2007; Douglas and Hegelheimer, 2007; Polding, 2007; Zeng and Takatzuka, 2009; Tuparova, and Tuparov, 2010; Ozkan, 2011; Johanesen, Erstad, and Habib, 2012). Findings emerged from these studies similarly suggest that contribution of VLEs shows itself in various educational components in academic terms as students' becoming more proficient in certain language skills as well as in affective terms as utilising collaboration and co-operation with peers which eventually leads to the formation of a group spirit. Moreover, Johanesen et. al. report teachers' negative attitude toward the use of VLE at their schools in primary and university level in the Norwegian context. However, over time it was observed that teachers who were opposing to the use of VLE in their contexts developed a number of teaching practices at both levels. In addition, changes were detected in relation to the perceived pressure coming from the governance of school which then was followed by teachers' coming to a mutual understanding and approval of VLE. Next, it is worth mentioning that teachers changed their views on the empowerment as regards their teaching practices as well as relationships with parents and co-teachers. Teachers further began to find VLE as a supporting professional, flexible and creative practice. Finally, they confessed that VLE triggered students' interest toward the course and in both type of schools, teachers stated they held the belief that VLE allowed for a closer follow-up.

A highly favoured course management system (CMS) for online learning Moodle, as defined in Wikipedia is "one of the most user friendly and flexible of the globally-free open source courseware products available, and is specifically designed to help educators who want to create high quality on-line courses. It is said to have excellent documentation, strong support for security and administration, and is evolving towards information. According to Wikipedia, Moodle enables teachers to provide graded assignments, lessons, and choice, to share documents, quizzes, workshops, and chat, and to offer a forum for learners, in a manner that is both easy and offers high quality teaching" (pa.3). Furthermore, as a courseware package and learning system, Moodle has great potential for supporting conventional classroom instruction, for example, to do additional work outside of class, to become the delivery system for blended (or hybrid) course formats, or even to be used as a standalone e-learning platform. Another important issue not to be disregarded about Moodle is that it is a web-based Learning Content Management System (LCMS), that is, a CMS and VLE designed around pedagogical principles, namely a social constructivist philosophy using the collaborative possibilities of the Internet. It allows teachers to provide and share documents, graded assignments, quizzes, and the like with students in an easy-to-learn way, and to create quality on-line courses (Al-Ajlan and Zedan, 2003).

Provoked by the underlying social constructivist philosophy, practicality and feasibility of Moodle that seems highly compatible with the ELT context; this study investigates the consequences of a blended Teaching English to Young Learners (TEYL's) course. The course was designed comprising of Moodle application and face to face instruction. The questions the answers of which were sought after in this study are as the following:

Research questions
1.   How ready are the student-teachers of ELT department for a blended face-to-face instruction and Moodle application in the Teaching English to Young Learners course?
2.   How do prospective teachers of English view such a change?
3.   In what ways, if any, did the blended application have an influence on the course in student teachers' point of view?
4.   Can Moodle be used as an aid to save time in crowded classes in the ELT department?
5.   If student-teachers had the chance, would they prefer the face-to-face instruction or the blended course?

THE STUDY
This classroom study initially sets out to explore the probable consequences of a blended TEYLs course comprised of Moodle applications and face to face instruction in the ELT context. It also tests the blended course as an alternative way to economise the time devoted to micro-teaching sessions shifting the time consuming follow-up teacher and peer criticism stage on to Moodle. Thus, time would be saved for more classroom discussions on ways to teach English to young learners in overcrowded classes. Totally 100 3rd year student-teachers taking the second semester of TEYLs course in the ELT Department of a Turkish University participated in this study. As the nature of this course requires, student-teachers are involved in lecture type sessions, discussions, and micro-teaching and follow- up critique procedures. The idea for blending the course with Moodle application partially emerged from the need for more time for the last procedure mentioned in addition to the inspiration that such a change might end up with a two-fold benefit on behalf of the course

attendants as becoming more proficient in both language teaching methodology and technology. With this estimation, student teachers were informed about the change in the course design and that from then on, they were going to upload their micro-teaching sessions on Moodle. A brief training on how to use Moodle sufficed as all student teachers were highly familiar with various similar forum and social media platforms on the net. The inclusion of Moodle to the course design entitled each student teacher the chance both to present their own work with comfort and ease and devote as much time as they needed to go through their peers' work. Moodle also provided the participants with the opportunity to visit the platform in their own time and as many times as they felt was adequate. With this new procedure, the student teachers criticised one another's work on Moodle instead of in the classroom setting, which was expected to save time.

On the other hand, student-teachers were busy with the other dimensions of the course and continued their face-to-face instruction and formed their groups for their final drama presentation. To elaborate, the assessment for this course had three legs: the micro teaching sessions uploaded on Moodle, criticism toward peers' work and finally a drama activity bearing two specifications; first, designing an appropriate drama activity with a purpose for teaching or recycling a language unit and second, giving a hidden moral or ethical message to their imaginary prospective young learners.

To start with, in order to identify the student-teachers' status of readiness for such a blended course, at the very beginning of the term, they were given a readiness scale. Following this, 14 week blended TEYLs course started. At the end of the semester, a questionnaire designed to elicit student teachers' views about the experience was administered. In addition, in order both to bring more depth to the study and warrant triangulation, semi- structured interviews were held with randomly selected 20 participants. The analysis of the mixed type data collected comprised of two planes; SPSS analysis of the quantitative data gained through readiness scale and the questionnaire and the interview data that were subjected to content analysis.

FINDINGS AND DISCUSSION

The demographic information section of the readiness scale reveals that the participants, at the time of the study, were between 19-25 years of age, and more than half of the student- teacher population had been actively using computers for about "*five to ten years*" (51,6%), "*almost every day*" (54,7%), "*for study reasons*" (67,2%) as well as "*to have fun*" (26,6%). The type of activities they mainly involved in comprised of "*searching information*" (%89, 1), "*sending and receiving mails*" (%62, 5), "*downloading*" (%46.9) and finally, "*chatting*" (%38). According to the scale results, we see that % 69, 8 of the participants were "*comfortable communicating with others over the internet*" and "*with online written communication*" (%73, 5). These clearly indicate that all student teachers were familiar with computer and internet use. Regarding cognitive, meta-cognitive, social/ affective strategies (Dörnyei, 2005) and autonomy, most probably as a natural consequence of their major, student-teachers appear to be very well aware of their own preferences and responsibilities for learning. To go in detail, they find themselves "*self-directed in terms of studying and learning*" (% 65.6), "*self-disciplined and capable of setting aside further study and homework time*" (% 67.2), and "*managing study time effectively and easily to complete assignments on time*" (% 65.7). Furthermore, they find it "*easy to set goals and believe that they have a high degree of initiative*" (%68, 2).
According to the results gained in the SPSS analysis, student-teachers appear to be autonomous learners; they hold the belief that "*knowledge is largely constructed by the learners and regard teachers as facilitators of learning than dispensers of information*" (% 71, 8). In addition, they believe that they are "*the only responsible people for their own learning*" (% 67.2); some say that they can "*figure out novel ways to solve problems*" (%43, 8). However, contrary to the confidence they displayed in almost all their answers, they apparently "*need constant feedback about their performance to stay on task*" (%71, 9).

When it comes to student-teachers' learning preferences, it appears that most can "*work in groups in collaboration with their peers*" (% 69.9); and also "*enjoy working alone with minimal support or interaction*" (%53, 14).

The analysis also reveals a positive attitude in the student teachers toward a blended course and we find out that they "*view blended learning as of at least equal quality to traditional classroom learning*" (% 76.6). Fifty-seven per cent appear to be "*willing to communicate actively with their classmates over Moodle*" and % 64.5 is "*enthusiastic to set aside an amount of time each week to effectively engage in activities on Moodle*". Taking into account all these findings reached at the end of the analysis, we may suggest that most of the student teachers appear to be ready for the Moodle application in their TEYLs course.

At the end of the 14 week semester, student teachers were given a 25 item Likert type questionnaire to elicit answers on their experience of the blended young Learners course from various standpoints. The results

demonstrate that according to the % 96, 5 of the participants the course was "*interest generating*", they were "*motivated to access the site of the course*" (% 91.4), it was easy for %70, 7 to "*feel motivated to start this course*", and for the majority, "*such an organisation doubled their benefit from the course*" (%81, 3). For % 98, 3, "*the course was satisfactory and valuable in academic terms*" and in a course like this, "*learning was easy and fun*" (%89, 8). Probably, derived from this belief, they viewed blended delivery as a "*useful tool for language teacher education*" (% 94.9). These resemble Sanchez and Hueros' (2010) findings by which they discussed that Moodle usage was directly influenced by perceived ease of use and attitude. As they put it, perceived ease of use and perceived usefulness on attitude were highly important motivational factors. However, we should not ignore the probability that the design of the course and the activities the student-teachers involved in may well have a trace on the positive reactions given by the participants.

As the questionnaire results reveal, cooperation on the Moodle was another component that triggered the student teachers interest toward the course. "*The presence of their peers on the net positively contributed to their learning*" (%81, 4) and "*instant feedback they received from both their teacher and peers on Moodle provided them with more awareness on their academic improvement as well as evaluation of their work*" (%91, 4). Furthermore, "*the virtual learning environment established by Moodle was deemed as supportive in terms of reaching the content of the course as many times as the student teachers needed in their own time*", which was not possible in a traditional face-to-face course (%93, 2). Parallel to what we found in the readiness scale, the student-teachers "*were comfortable working on Moodle*" (%94, 9), "*did not experience any difficulties once they learnt how to do proceed through Moodle*" (%76, 3) and when they faced difficulties "*the instructor was always there to help*" (%98, 3).

According to Keramati, Mofrad and Kamrani (2011) readiness factors have the most important effect in e-learning outcomes besides teacher's motivation and training. In line with this finding, if tutors are motivated and engaged, then the process will ultimately produce a better result for all concerned (Polding, 2007). If a student is not self motivated, or if getting online is considered a challenge or inconvenience, the use of Moodle will be difficult (Beatty and Ulasewicz, n.d.). Furthermore, they depict that feedback is the most important factor of any kind of communication, especially in learning. While designing and implementing learning activities, teachers need to be very aware of providing good feedback. In distance learning (also e-learning) the feedback has more importance because of the lack of face to face interaction.

On the other hand, in spite of the readiness for a blended course the student-teachers displayed in the analysis of the scale, we see the reality that their instructor was around whenever they encountered difficulties strengthened the participants and gave them a sense of security. Teacher's existence for support motivated the student-teachers and led to participants' more positive reactions. This feeling might have emerged from the fact that the student-teachers were experiencing a blended course for the first time and were sometimes hesitant about what is right and what is wrong to do. In such instances, with teacher's support they felt themselves more at ease. Similarly, Brenton (2009) notes the importance of the teacher's presence in online courses as follows "(t)he role of the teacher in e-learning is just as important to student learning as it is in the seminar room or lecture hall" (p. 97)

Although not within the scope of this study, it seems to be worth mentioning as the results signal related implications; teacher support can be considered as an important component leading to course satisfaction. A significant body of literature has supported the assertion that communication in the classroom is central to the learning process (Baker, 2004; Moore&Kearsley, 2005; Saba, 2007in Lee, Srinivasan, Trail, Lewis and Lopez 2011, p.162). To go in detail, Lee et. al, (2011), studied the relationship between course satisfaction and teacher support in an undergraduate online course in the USA. They explored the matter from three aspects of support; instructional, peer, and technical support. The results show that perceived support was significantly related with to the students' overall satisfaction of the course. Their findings suggest that teachers should communicate what types of support are available to students and provide an easy way of accessing and taking advantage of the support. Similarly, Paechter and Maier (2010) state that students prefer face-to-face learning when discourse with teacher serves to build up knowledge but appreciate online learning for its potential in providing a clear and coherent structure of the learning material, in supporting self-regulated learning, and in distributing information. Furthermore, as the findings of this present study imply, students prefer face-to-face learning for communicative purposes in which a shared understanding has to be derived or which interpersonal relations are to be established. When conceptual knowledge in the subject matter or skills in the application of one's knowledge are to be acquired, students prefer face-to face learning. However, when skills in self-regulated learning are to be required, students advocate online learning. Therefore, e-learning courses should be designed, in a way to implement face-to-face components in which the instructor obtains the role of a facilitator of learning process and students receive explicit feedback for their accomplishments. The instructor should provide

opportunities to develop knowledge together and students should obtain the opportunity to demonstrate their knowledge and develop a model on a subject matter.

In spite of the positive reactions shown toward Moodle and the blended course, and although all the lecture notes in the form of PowerPoint presentations together with songs, rhymes, chants, tongue twisters, games, visuals and the like were already uploaded on the site, an undeniable percent of the student-teachers said that they had a tendency to forget information obtained from the net as opposed to published materials (% 47, 5). This finding can be synchronised to the findings reached by Woody, Daniel, and Baker, 2010; Poulton, Conradi, Kavia, Round and Hilton; 2009. In fact, Noorhidawati, and Gibb (2008) categorise different types of e-book use in an academic setting: (a) fact finding; (b) finding relevant content; and (c) extended reading. The most popular reason for using e-books was for "finding relevant content" which indicated that e-books were not read in their entirety but instead were consulted or used for reference purpose. Most probably, the echoing findings reached in this study were the result of a belief derived from a similar epistemological ground. This may also be a reflection of their habit they developed through their face-to-face educational background.

In terms of the learning outcomes, as % 62, 7 stated, student-teachers "*put more time into this class than they would have invested in a regular TEYLs class*" and eventually, % 45, 8 bear the belief that they "*learnt more than they would have in a traditional face-to-face class*". "*The activities they involved in the blended course greatly contributed to %89, 7's ability to constructively criticise and discuss, as well as confidence in their ability to use technology*" (%91, 5), which were "*relevant to their real life needs as prospective language teachers*" (%81, 4). The student teachers consider blended courses as "*giving a deeper understanding of the course content as opposed to traditional ones*" (%67, 8) and maybe based on similar beliefs, they wish they "*had other blended courses in the department*" (%77, 6). If given a chance, %64, 4 "*would take the blended course rather than the traditional TEYLs course*". This finding echoes in Blake, Wilson, Cetto and Pardo (2008) who examined the case of first year Spanish course offered at the University of California, in both hybrid and distant learning format. As they argue, the students are not being disadvantaged by taking Spanish in a non-traditional format. According to their view, without doubt, students will continue to self-select for the type of language instruction they prefer whenever given the chance, as also found in this study. Accordingly, the profession should concern itself with providing legitimate options increasing all avenues of access to language instruction. (p. 124).

When it comes to results reached through interviews, we reveal that out of 20 interviewees, only one stated that s/he did not benefit from Moodle application and the blended course. The remaining participants explained the ways they benefitted from the blended course in various ways as displayed in the table below.

Table 1. Areas students benefitted from blended course

n	Benefits gained from	F
1	Criticism toward friends' work on Moodle	16
2	Technology use	16
3	More opportunities for discussion	12
4	Preparation of micro teaching sessions on the net	10
5	Awareness of better language use	8
6	Awareness of innovative ways for teaching	6
	Total	68

As seen in the table, the most frequently cited benefit of the blended course according to the student-teachers was "*providing and receiving criticism regarding both their own work and their friends' work*" (16 citations). As they stated, they "*found criticising their peer's work negatively in a face-to-face situation was more difficult than doing it in a virtual environment*". As the results show, for some, this procedure helped them to eliminate their sense of hesitation and shyness in criticising one another's work. In addition, in terms of the time allocated to the course; a lot many face-to-face class hours were saved, and thus the need for extra time to catch up with the syllabus requirements was eliminated.

Furthermore, the course had a twofold benefit; first, they "*learnt how to teach young learners and secondly, became more familiar with technology*" (16 citations). As they believed, "*Moodle provided a ground for more discussions*" (12 citations), and "*preparing their micro teaching sessions on the net was easier than doing it with pen and paper*" (10 citations). Finally, "*seeing their micro teaching sessions on the internet and going through these criticisms to learn about peer comments created an awareness in them in terms of using classroom language in a more effective way*" (8 citations). This procedure additionally seems to have "*opened new horizons in front of them to teach in alternative ways*" (6 citations).

The participant student-teachers also talked about the most beneficial aspects of the blended course. The first three that bore the priority were respectively "*being able to reach their peers' sessions on Moodle whenever and as many times they felt the need*" (14 citations), "*displaying their session on Moodle rather than presenting it in the classroom*" (9 citations), "*being able to hold more discussions on the micro teaching sessions than they could have in the classroom*" (7citations).

When asked whether or not the students are satisfied by the blended course, parallel to Kufi and Ozgur's (2009) findings where they report that the majority of their participant students was positive about the use of an interactive web environment and found its use beneficial for their learning, all respondents of this study but one commented positively. When asked about the experiences that contributed most to the course satisfaction and the most important predictors for their satisfaction, we see that "*the real life likeliness*" bears the highest priority*" (14 citations) together with "*using Moodle was similar to using social media*" (14 citations) which they were highly familiar with. The accompanying factors are shown in the following table.

Table 2. Reasons for satisfaction by the course

n	Satisfied by the course because of	F
1	Real life likeliness	14
2	Limitless time	12
3	Curiosity	9
4	Equality	6
5	Confidence	6
6	Absenteeism	5
7	Opportunity to reach everybody's work as many times as needed	4
Total		56

In regard to other reasons, contrary to face-to-face environments, in the blended course "*there was no time constraint and they were able to reach one another's work in their own time*" (12 citations). Moodle also "*triggered their curiosity to learn about who commented on their work and whether they commented positively or negatively*" (9 citations). Similarly, as there was no time constraint as opposed to the traditional classroom atmosphere, they "*had equal rights to criticise their peers' work*" (6 citations) which "*gave them more confidence*" (6 citations). In their studies, Carr,2000; Dreyer, Bangeni and Nel,2005 claim that many students belatedly find out that both hybrid and distance learning language classes require high degree of self-motivation and independent work skills. This accounts for the routinely high dropout rate for the distance learning environments for all disciplines (in Blake et. al 2008, p.115). Contrary to the findings of their studies, the results obtained in this present study indicate that with Moodle, student-teachers "*did not miss any micro teaching sessions and this eliminated the problem of absenteeism*" (5 citations) and finally, "*Moodle let the students view their friends' work as many times as they felt adequate*" (4 citations).

The three mostly satisfying activities were "*working on Moodle as a whole*" (14 citations), "*working collaboratively for the drama activity*" (11 citations), and eight student-teachers stated that they were "*satisfied by all the activities they were involved in during the course period*". Furthermore, the student-teachers were invited to share their experiences on, if any, using any of the components of the blended course for other reasons except for the course itself. The answers indicate that the blended course encouraged the students to try new ideas out. To illustrate, almost all the students stated that they "*went through all the micro teaching sessions to gain more insight and learn about whether they could create a repertoire of lesson plans as prospective teachers*" (18 citations). Some participants who were already teaching at language schools declared that they "*tested their friends' sessions in their classes*" (12 citations). Ten "*prepared extra lesson plans, tried them in their classes and shared them with their friends on Moodle*". Four "*used the songs which were shared on Moodle to indirectly teach their students vocabulary and new structures*". Two student-teachers said that they "*used the microteaching visuals uploaded on Moodle to establish a positive attitude in their primary or secondary level brothers and sisters toward learning English*".

When asked, all students except one stated that they "*would choose a blended course rather than a face-to-face course if they had the chance to do so in the future*" (19 citations). This finding, as quoted above, echoes in the belief Blake et al. (2008) hold regarding their participants' probable learning preferences for the future.

Although the majority uniformly wanted to take a blended course, the reasons varied; first, "*absence of time constraint played a crucial role*" on the students' preference (16 citations), next, students found the "*blended course superior to a face-to-face one in terms of keeping what you have learnt in your long term memory*" (12

citations). They attributed this to the belief that their mind was activated from two different perspectives. To elaborate, as student-teachers they concentrated on the theoretical side by the classroom lectures on one hand, building upon what they already knew about teaching English to young learners. On the other hand, they put their newly received knowledge into practice on Moodle. In this respect, the participants find the blended course more effective than a face-to-face course. In addition, in their view, the inclusion of technology within the course enriches the content since the student-teachers "*added to their knowledge of both technology and course content*". They also found the blended course "*fun and satisfying*", they felt themselves "*more relaxed as compared to a face-to-face course*" and finally, they felt "*more confident*" as they were able to reach all the course content and micro teaching sessions on Moodle to use whenever they needed.

In the interviews, the students were asked about their comments on the probable ways to improve the blended course. Their responses are shown in the table below.

Table 3. Probable ways to improve the course

n	Course could have been more improved if	F
1	25% of assessment had been made by peers	9
2	An extensive blog had been added for more materials	3
3	Some micro teaching sessions had been held face-to-face	2
4	More examples of games had been uploaded on Moodle	1
5	Micro teaching sessions had not been obligatory	1
	Total	16

The most frequently cited suggestion to improve the blended course was related with the assessment technique used. Nine out of 20 students thought that "*25% of the assessment procedure could have been devoted to peer assessment*". This idea may have emerged from the feeling that the students might have felt themselves even more secure in such a situation. The next suggestion was related with the technical aspect of Moodle use. According to three students, "*if an extensive blog had been added to Moodle, it would have been much easier for them to upload their materials*". As they explained, with this extended blog, they would both increase their upload quota of 20 MB and also would not have to work on a Word page before they uploaded their micro teaching session. Two citations signal the student-teachers' "*need for face-to-face interaction with peers and teacher*", which may also mean a need for more security. As these citations reveal, according to some participants, at least the first micro teaching sessions could have taken place in the traditional classroom setting. Rovai and Jordan (2004) elaborate on the situation as dependent learners are less self-regulated, and they need frequent direction and reinforcement from a visible professor. As they put it, these students feel confident and relaxed when combined with periodic opportunities for face-to-face interactions. Virtual learning environments necessitates technological ability and frequency of usage that varies from student to student based on individual characteristics. Accordingly, all these differences influence the benefits that each student derives from online environments and help explain why some students are not fully satisfied with online courses and feel isolated. On the other hand, as they suggest, discussions in traditional classrooms, where vocal students can dominate and discussions may be superficial, spontaneous, and limited, while they can frustrate those students with a more introverted personality.

These student- teachers who needed a face-to-face interaction, as revealed during the interviews, wished to use the feedback they would receive from the lecturer as a guide for their forthcoming micro teaching sessions on Moodle. As another suggestion, one student-teacher, keeping in mind the strong emphasis put on games in a young learner class during the face-to-face lectures, expresses "*the need for more examples of games on Moodle*". Finally, one citation is somehow a complaint that "*the micro teaching sessions should have been on a voluntary basis rather than obligatory*".

Table 4. Student-teacher remarks on the blended course

n	Positive	F
	I am happy to have such an experience	19
	Blended instruction is superior to face-to-face instruction	8
	The course added to my world knowledge	8
	The course added to my academic qualities	8
	I would benefit from Moodle and similar means in the future as a teacher	7
	I will miss such a course	4
	Total	54

Regarding the students' closing remarks about the course, all 54 reactions that came from the student-teachers were entirely positive. To go in detail, the activity they involved in turned into a social interaction which was highly fruitful by various means. To illustrate, they were "*happy to have had such an experience*" (19 citations), and they viewed "*blended instruction as superior to face-to-face instruction*". Moreover, as the student-teachers clarified during the interviews, by its blended nature, "*the course added to their world knowledge as well as their academic qualities*" (8 citations). In their opinion, they became more familiar with technology; they interacted with one another whenever they needed and definitely more frequently than they could have in an only face-to-face course. The feedback they received from both their peers and the teacher motivated them, and they "*would like to benefit from Moodle and similar means in the future as teachers*" (7 citations), and they stated that "*they would miss such a course*" (4 citations).

CONCLUSION

Van Raaij and Schepers (2008) attribute the success of a virtual learning environment, to a considerable extent, to the students' acceptance and use of such an e-learning system. In line with this proposition, initially, we explored whether the student-teachers of ELT department were ready to accept a blended face-to-face instruction and Moodle application in the Teaching English to Young Learners course in this study. The findings acquired from the analysis of the data reveal that all student-teachers were familiar with computer and internet use and they appeared to be highly autonomous as learners; well aware of their own preferences and responsibilities for learning. However, contrary to the confidence they displayed in their answers, they also confessed that they needed constant feedback and support from the peers and teacher on Moodle about their performance to stay on task. Senior (2010) emphasises the vital role of support coming from peers and teachers in building and maintaining learning communities. As for the interactive support the participants of this study needed, the social constructivist nature of Moodle appears to have played an important role. The presence of peers and teacher together with instant feedback from both parties on the management system led to more awareness on the participants' academic improvement. This social interaction further contributed to the student-teachers' conceptualisation of the meaning and role of objectively evaluating themselves as prospective teachers. Apart from all these above, Moodle encouraged the participants to give negative but constructive criticism for their peer's work, which they would have found rather difficult in a face-to-face situation. Based on all these findings, we may suggest that blending the face-to-face situations with VLE's may not fully meet the expected outcomes of a given course. That is, the blended courses should be designed in a fashion that the nature of both the course itself and population taking the course should not be ignored, taking into account the needs of the course attendants. Moreover, blended courses should not be mistakenly viewed similar to an on-line delivery; on-line and face-to-face components should be carefully balanced so that attendants would be provided with adequate interaction with and support from the lecturer and peers.

Similarly, in designing teaching learning activities, teachers should not underestimate the importance of feedback. Based on the findings, we may suggest that student teacher as well as peer interaction and feedback both in face-to-face and VLE contexts should be carefully figured out while designing blended courses.

One the inquiries of this study was whether Moodle could also be used as an aid to save time in crowded classes. The results show that, contrary to the previous years, the class hours sufficed through Moodle component. On the other hand, regarding the time student-teachers invested in the course, it is apparent from student-teacher remarks that the flexibility of study hours led them to putting more time and effort into the course than they would have in a regular TEYLs class. This ended up with more learning outcomes as compared to a face-to-face class. Furthermore, Moodle made it possible for course attendants to reach the course content as many times as they needed in their own time, which was not possible in a traditional course. Consequently, student-teachers managed their own time according to their own desire. Thus, Moodle component can be said to be effective in triggering the student-teachers motivation for self-study as well as removing the time constraint on behalf of both the lecturer and the course attendants.

When it comes to how the student-teachers viewed the change in their course, according to the results, the majority found that the variety the blended delivery of the course brought to the teaching learning situation was interest generating, and the course takers were motivated to access the site of the course. The blended nature was found to be satisfactory and valuable in academic, fun and enjoyable in attitudinal terms. Similar to Suchanska, and Keaczkowska (2007) and Brine, Wilson and Roy's, (2007) findings, Moodle enhanced the teaching learning process not only regarding methodology but also technology. To sum, blended organisations can be used as a means to double the participants' benefit from courses and Moodle appears to be appropriately fitting in the area of language teacher education as a development tool.

In regard to student-teachers' gains from the blended course, the course had a twofold benefit; first, it contributed to the participants' ability to make assessments on both their own and peers' work, as well as constructively criticise and discuss teaching issues. Secondly, they appear to be aware that blending traditional courses with technology such as virtual components was going to be a crucial part of their teaching procedure in the future. The blended course was viewed as giving a deeper understanding of the course content as opposed to traditional ones. In line with Bremer and Bryant (n.d.), the participants of the present study appear to be intrinsically motivated toward taking blended courses rather than traditional courses in the future. This may have derived from the fact that technology shows itself in every aspect of our lives including education; the participants found the blended course relevant to their real life needs as prospective teachers. The finding reached may imply the need for teacher education programmes to revise their curricula to keep up with the current improvements compatible with them and implement the necessary changes.

To sum, we may conclude that in general terms the blended TEYLs course was found to be advantageous in terms of triggering the motivation and provoking the interest of the course attendants, using time more effectively and flexibly by both parties involved, developing a mutual rapport among the participants, bringing the real life likeliness to the teaching learning context. However, negative criticism, though only a few, and suggestions drawn to better the course should not be ignored.

Finally, the results reached are limited to this study itself and cannot be generalised. The replications in different contexts may contribute to a deeper understanding of the matter.

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NEEDS OF THE LEARNING EFFECT ON INSTRUCTIONAL WEBSITE FOR VOCATIONAL HIGH SCHOOL STUDENTS

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ABSTRACT
The purpose of study was to understand the correlation between the needs of the learning effect on instructional website for the vocational high school students. Our research applied the statistic methods of product-moment correlation, stepwise regression, and structural equation method to analyze the questionnaire with the sample size of 377 participants. The empirical results showed that the explanatory factors representing the needs for instructional website can be orderly ranked as: the content and structure of teaching materials, the interactive design, the establishment of system configuration, the layout design, and the interface design. The explanatory factors representing the learning effect of the instructional website can be orderly ranked as the learning environment and equipment, the system learning, the courses interactive, the teaching effect. In addition, the needs for instructional website were positively correlated to the learning effect. The interaction design was intermediately correlated to establishment of system configuration.
Keywords: Instructional Website, Learning effect, e-learning

The improvement of technology brings up the unprecedented challenges for education. In 2009, the survey on the use of broadband network in Taiwan disclosed that the population of Internet user in Taiwan was more than 16,000,000 people. There were about 5,600,000 families in Taiwan accessible to the Internet. The penetration rate of Internet access was 75%. Considering the ages (above 12) of the once used the Internet, 99.45% of the users age between 15 and 19 (the teenagers). This is the highest percentage comparing to users of other ages (Taiwan Network Information Center, 2009). The evidences showed that the application of the Internet has been deeply rooted in our daily life, and has become the channel of the youth generation to acquire knowledge. E-learning makes it possible for students to acquire knowledge from the in-class teaching, and via the Internet as well. Kiliç-Çakmak (2010) define E-learning as an on-line activity of synchronies or asynchronies for students and teachers within the same time interval to apply specialized technological learning environment. E-learning is a teaching program plan based on hypermedia, using the features of Internet to create vigorous learning environment, train the students to learn independently and continuously (Khan, 1998) . Under the E-learning environment, the independent characteristics of students are more obvious and thus influence learning performance (Chen and Lin, 2002). Simultaneously, students can construct the knowledge system by other's. Moreover, E-learning is a bilateral way of communication between teachers and students (Peng, 1995).

If a set of web design indication can be provided, then it is easier to develop the useful educational resources. At the same time, web evaluation indicators can serve as the criteria for the educators, enabling the users to find the decent learning environment effectively (Chang, 2007). "Evaluation indicators for the instruction website" are established and developed to evaluate the principles of the online instruction, examining whether the ability of learner was considered, whether the learner is happy to learn, and whether the learning effect is shown (Wang & Chuang, 2003). In the US, traditional expository teaching method is not suitable for 70% students in medium school. Many students perform poorly on schoolwork or even lose their learning motives. The improper teaching strategy is the main cause of such phenomenon (Wang & Chuang, 2003). Some studies show that the use of information technology will improve the learning effect (Marki, Maki, Patterson & Whittaker, 2000; Schutte, 1997). But, other believes the use of information technology has little benefit on or even decreases learning effect (Kulik, 1985; Clark, 1985). However, when technology can provide different learning environments, we would expect different learning effect (Leidner & Jarvenpaa, 1995). Our paper assumes the relation between the assessments of instruction website and learning effect is as followed:

Assumption 1: evaluation indicators are positively correlated to the student's learning effect.
Assumption 2: evaluation indicators can predict learning effect, and have significantly explanatory ability.
Assumption 3: evaluation indicators have positive and direct effect on the student's learning effect.

LITERATURE REVIEW

Learning style changes and progresses via the Internet platform and becomes friendly, convenient, and easily accessible. Khan (1998) mentions the features of online teaching, including interactivity, teaching materials by multimedia, open system interworking, online searching, space and time transcending, global shared platforms, and controllable by learners. Pan (2006) proposes the following 4 features for online teaching: (1) the World Wide Web is universal and easy to learn and use and has large population around the world; (2) the teachers and students can use the online platform to teach and learn, transcending the limit of time and space; (3) the cross-platform feature of World Wide Web is available on any PC or Macintosh; (4) the students can learn everywhere with Internet. Yang (2000) believes the combination of the Internet and teaching can be expressed in three models. First, the "face-to-face resource model" combines the Internet and traditional classroom teaching. Second, "schoolwork guidance model" employs the instruction website to provide teaching resources, discussion on the in-class content, the announcement, and hints on the homework. Third, "online teaching model" completely utilize the Internet to carry on the distance teaching, including teaching process, teaching activity, and grading.

E-learning is a web-based learning system that utilizes World Wide Web to achieve learning goal (Chang ,2002). In general, E-learning has 3 advantages. First, the hypertext used by WWW provides the user-friendly interaction and enables the users to control the information by themselves. Second, it can transmit the multimedia, such as voice, animation, video, etc. The transmission cost is low and the users can download the information repeatedly. Third, it provides true interaction. The linkage between webpages and the interactive layout design enables the interaction and communication between Internet users and server (Starr,1997). American Society of Training and Education (ASTD) indicates that E-learning is the learning process for users to learn by digital media, including Internet, corporate networks, computers, satellite broadcast, tapes, video tapes, interactive televisions and disks. The application ranges from Internet learning, computer learning, virtual classes, digital collaboration (Zou, 2003 ； Xie, 1997). E-learning no longer focuses on the electronic aspect but on the education aspect. From the perspective of learners, learning can happen anytime and anywhere. Time and space are not limited anymore. It is easy to use and the users enjoy the learning experiences. E-learning improves the learning ability of students by sufficiently encouraging them to engage in the learning activities, creating an extremely different learning experiences.

Type the keyword "instruction website" in the Google search engine (www.google.com), more than 5.52 million results appear within the domain of traditional Chinese. Instruction website mainly uses hypermedia, in the other words, uses the attributes and resources of World Wide Web to establish a meaningful learning environment, aiming to train the individuals to learn independently and to continue the learning activities (Wang & Chuang, 2003). Tu (2005) proposes that the instruction website should equip 3 functions: the function of online teaching, the function of online interaction, and the function of system management. After the in-class teaching, teachers can employ online platform to interact with students or manage the homework submission with synchronies or asynchronies. Such teaching style primarily solves the problem of time limit. Students can interact with teachers on the Internet, obtain the digital teaching materials, acquire more teaching resources, or share the learning experiences with others. As for the types of instruction website, it is common to divide into three types. The first is teaching resources website, collecting the teaching and learning resources, for example, the educational information programs and teaching material resources center of Taiwan Ministry of Education. The second is online teaching website, aiming to share the knowledge. Such website provides online teaching and learning classes, for example the demonstration experimental classroom of physics teaching (http://www.phy.ntnu.edu.tw/class/demolab/indexTree.html). The third is learning social group in which learners engage in learning activities, communicate and discuss their knowledge and experiences via the Internet, for example EduCities (http://www.educities.edu.tw/). Therefore, when establishing a new instruction website, different points should be concerned in order to accommodate the differences of website users and functions (Huang, 2000).

The general assessments of instruction website are not completely the same. The primary role of instruction website is to assist the student's learning activity. Therefore, learning performance should be examined in the assessment. The assessment portfolio should focus on whether the instruction website provides the following functions of online test, learner's self-assessment, and feedback of teaching (Yu, Hsieh, Chen, and Lian, 2007). As the use of instruction website is a style of open learning, students can begin the learning activity anywhere, anytime, with any computer. The scheme of the assessment should focus on the role of assisting the students and

improving the communication among the users of instruction website. Therefore, the design of the website considers the needs of the teachers and students. The designer should examine whether learners achieve the expected learning goal or collect the specified data and information. Then the designer can modify the content of the website and establish the teaching (or learning) features of vigorous interaction and attractive content in order to improve the learning motive and interest of learners. The teaching (or learning) effect of instruction website can thus be discovered. Before studying the indicators of instruction website, we must have a basic idea about the "indicator." Indicator is a set of characteristics that we use to evaluate a concept or an abstract subject. It can be specifically described and clearly defined, and thus becomes a criterion to judge whether the abstract subject is good or bad. In addition, the specification of indicators reflects the important aspects that researchers concern with and it divide the relative aspects into different pieces. On the other words, indicator employs a subject to represent the other's status or variation. The former serves as the indicator of the latter. Indicator can simplify the abstract subject and demonstrate clearly a deeper understanding of certain concept. Therefore, indicator can be the reference of value assessment (Wang, 1998; Wang 2002). The "evaluation indicators" of instruction website is a set of criteria that we use to examine whether E-learning aligns with students' expectation and ability and whether the users are willing to utilize the instruction website to teach and learn (Chang 2007).

Local research papers have developed different evaluation indicators, as shown in Table 1. However, most researchers believe that the primary concern of the instruction website should focus on the aspect of "creditability and creditability of the website content." Lwo (2004), Yu et al. (2002) emphasize more on the teaching design, learn adaptability, proper learning assistance work. They stand in the shoes of the learners. Moreover, Chuang and Tsai (2005) propose an assessment of instruction website, considering "system configuration." For example, the system designed for individual learning material, for observation and records of learner's behavior and grade, for randomly assigned after-class test, and for simulation of virtual teaching.

Table 1: Literature review of evaluation indicators (in traditional Chinese)
Resources: collected and arranged by the authors

Authors	Topics	The aspects of assessment indicators (dimension)
Ho, Chen, and Chen (1988)	Research on the Assessment Indicator of Online Teaching System	1. Teaching material checklist 2. Collaborative interaction 3. Waiting time 4. Webpage design 5. User-friendliness
Ouyang and Lin (2002)	Assessment Indicator of the Quality on the Instruction Website for Children	1. Content 2. Layout design and structure 3. Multimedia feature 4. Feedback and support 5. Description of the website
Lwo (2004)	Assessment Indicator of Educational Multimedia Website	1. Properly correct content 2. Interactive approach and style 3. Quality and adaptability of media 4. Attractiveness 5. Quality of transmission 6. Learning adaptability 7. Proper learning assistant working 8. Build-in intelligence
Yu et al. (2002)	Assessment of the Instruction Website: Difference between Learning Assistance and Completeness of Functions	1. Creditability of content 2. Linkage between the websites 3. Usefulness of navigators 4. Teaching design 5. Visual design
Chang (2007)	The Introduction of Assessment on the Instruction Website	1. Content and structure of the website 2. Visual layout design and multimedia application 3. Interaction and interface design 4. Functions and system management
Chuang KC & Wang, J. (2003) ; Chuang, K.C. & Tsai, C.F. (2005)	Assessment Guidelines on e-Learning Websites	1. Teaching material and the structure 2. Layout design 3. Interface design 4. Interaction design 5. establishment of system configuration

Laura (1999) collects and analyzes the evaluation indicators from 12 institutes that provide the assessment service for website, as shown in Table 2. We can learn that "content" is the most important indicator in the website assessment, regardless the types of the websites. Next is design/presentation/format.

Table 2: Frequently used 12 assessment principles for instruction website assessment

Rank	Evaluation indicators	No. of Websites
1	Content	12
2	design/presentation/format	11
3	update frequency	8
4	audience/community needs	7
5	currency/timeliness	7
6	rating system	7
7	Authority	5
8	availability/speed	5
9	value/usefulness	5
10	accessibility/search ability	4
11	scope	4

Resources: Laura, G. M. (1999), Evaluating net evaluators, Searcher, 7(2), 57-66.

Khan (1997), Diagle and Furner (2004), Chung and Tsai (2005) examine the instruction website by 6 dimensions, as shown in Table 3. They agree on "students' interaction and collaboration," "layout design and multimedia integration," and "the learning assessment mechanism."

Table 3: Comparison on dimensions of instruction website assessment by local and foreign research papers

Assessment dimension	Khan (1997)	Daigle & Furner (2004)	Chuang & Tsai (2005)
1.content		✓	✓
2. students' interaction and collaboration	✓	✓	✓
3. linkage and transmission of information			✓
4. layout design and multimedia integration	✓	✓	✓
5. design suitable for learning background and daily life		✓	✓
6. learning assessment mechanism	✓	✓	✓

Resources: collected and arranged by authors

From previous literatures, we can learn that "learning assessment mechanism" is a core indicator among the evaluation indicators for instruction website. It shall have the properties of learning effect and effect evaluation. In addition, many researchers examine the functions of bulletin board, discussion board, proper learning scenarios and timely responds and the influence on learners' motive and interests to measure the indicators of "layout design" and "learners' interaction." Hence, our paper employs the 5 dimensions of assessment principles in Chuang and Tsai (2005), including the content and structure of teaching materials, layout design, interface design, interaction design, and the establishment of system configuration.

Hudspetch (1997) indicates that learning effect is based on students' ability to collect the information and achieve the course goal. Such test is carried on in the class and usually by teamwork. Chen (2003) proposes a feedback value by continuously examining the learning process and performance of the learning activity. Learning effect is something gained by the students when he/she complete learning certain knowledge or skill. The test on the learning performance is helpful for us to understand the efficacy and efficiency of learning activity. We do not have to wait until the class to examine the learning performance. The test of learning performance can be conducted within the learning process. In addition, the test should last after the learning activity. Continuous test can help understand whether the students learn how to apply the knowledge or skill taught in the class. Our paper defines learning effect as a process in which we examine whether the students can achieve their learning goal after the learning activity. E-learning is different from traditional in-class learning. It has the multiple benefits, such as convenience, initiatives, and interaction. As E-learning is not confine to time and space, students can acquire the knowledge anytime and anywhere. Concerning the relation between the frequency of using instruction website and the learning performance, many studies show that the more

frequently the students use the website, the better learning effect the student can perform (Wang & Hwang, 2002; Ku, 2002; Lin, 2003; Wahlstedt, 2005; Arbaugh, 2006). However, there are some other studies reject such relation. For instance, Wu (2004) invite the 11th grade students in Ping-tung Girl's Senior High School to

conduct a research about the relation between learning portfolio and learning effect on E-learning instruction website. The result verifies merely the significantly positive relation between the time of online reading and learning effect. Other factors such as the login counts and number of classes have no significantly positive relation with learning effect. Currently, the research on E-learning primarily applies the function of information system to explain learning effect. Our paper studies the influence of necessary content and interface of the instruction website on the students' learning effect by conducting questionnaire analysis. Moreover, we search for the proper presentation style for E-learning students, and thus can improve the students' learning effect.

RESEARCH METHOD
RESEARCH SUBJECTS
We conducted a study on students from department of data management in vocational high schools, which assisted the web design course with instruction websites. Five cities (Taichung County, Taichung City, Changhwa County, Yunlin County and Nantou County) in central Taiwan were included and two schools of each city were randomly sampled. We prepared a guideline for the students to follow and asked the teacher to give an introduction prior to answering the questionnaires. A total of 400 students were enrolled to the research and 23 excluded because of data incompletion or failure in item analysis. The effective response rate reached 85%.

RESEARCH TOOL
The instruction website assessment developed by Wang & Chuang (2003) was modified into the questionnaire for our research. The questionnaire with 28 items consisted of five domains: 6 items for teaching material and the structure, 5 items for layout design, five items for interface design, 5 interaction design and 7 items for establishment of system configuration. All the questions were based on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). An item analysis indicated significantly strong internal correlation ($p < 0.05$). The correlation coefficient of each item was all larger than 0.3 (Wu, 2003), ranging from 0.51 to 0.90.

Confirmatory principal factor analysis with oblique rotation was used to investigate the structure of the questionnaire. We intended to keep items with loading > 0.3 and delete items which loaded on multiple factors or diverged from the original structure. The five factors of the structure have explained 57.48% of the overall variance. The loadings in each factor were 0.57 to 0.88 in teaching material and the structure (factor one), 0.56 to 0.78 in layout design (factor two), 0.54 to 0.57 in interface design (factor three), 0.67 to 0.87 in interaction design (factor four) and 0.56 to 0.96 in establishment of system configuration (factor five). Cronbach's alpha analysis demonstrated valid internal reliability (overall coefficient=0.81), with the value ranging from 0.68 to 0.86 for each factor.

The learning effectiveness scale in our research was developed based on three studies, featuring on student learning effectiveness on web design curriculum (Li, 2008), scale of web-based instructional system (Liang, 2001) and learning effectiveness of vocational high school students (Chang, 2007). The scale with 20 items contained four domains: 6 items for instruction, 5 items for systemic learning, 5 items for course interaction and 4 items for equipment. An item analysis indicated significantly strong correlation ($p < 0.05$). The correlation coefficient of each item was all larger than 0.3 (Wu, 2003), ranging from 0.49 to 0.93.

Confirmatory principal factor analysis with oblique rotation was used to investigate the structure of the scale and items with loading > 0.3 were retained. The four factors of the structure have explained 67.71% of the overall variance. The loadings in each factor were 0.40 to 0.90 in instruction (factor one), 0.45 to 0.83 in systemic learning (factor two), 0.49 to 0.82 in course interaction (factor three) and 0.63 to 0.87 in equipment (factor four). The overall Cronbach's alpha coefficient was 0.87, with the value ranging from 0.85 to 0.88 for each factor. The internal consistency of the learning effectiveness scale was high.

RESULTS AND DISCUSSION
RESULTS
1. Basic characteristics
For sex difference in the study population, 40.6% of the students were male. The percentages of each grade were 20.7% for the first, 47.7% for the second and 31.6% for the third grade. Percentages for never, < 2 years, 2 to 5 years and > 5 years in web use were 2.7%, 19.1%, 62.2% and 16.0% respectively. For distribution of average days in a week for web use, the responses from the participants were 8.0% for < 1 day, 41.4% for 2 to 4 days, 15.4% for 5 to 6 days and 35.5% for every day.

2. Instruction website assessment
The scores of each factor in instruction website assessment were 4.10 in teaching material and the structure,

3.75 in layout design, 3.63 in interface design and 3.80 in establishment of system configuration. As the scores indicated, the factor of teaching material and the structure was "important" to "very important" and the other factors were "neutral" to "important" for students to assess the instruction websites.

Table 4: Summary for instruction website assessment

Factor of website evaluation	Number of questions	n	Mean (factor)	Standard deviation	Mean (item)	rank
teaching material and the structure	5	377	20.54	3.25	4.10	1
interaction design	5	377	19.28	3.30	3.85	2
establishment of system configuration	6	377	22.80	3.86	3.80	3
layout design	5	377	18.76	3.07	3.75	4
interface design	4	377	14.54	2.58	3.63	5

3. Analysis of learning effectiveness

The scores of each factor in learning effectiveness analysis were 3.61 in instruction, 3.64 in systemic learning, 3.63 in course interaction and 3.87 in equipment. Average of all the factors were evaluated as the range between "slightly agree" and "agree".

Table 5: Analysis of learning effectiveness

Factor of learning effectiveness	Number of questions	n	Mean (factor)	Standard deviation	Mean (item)	rank
Instruction	6	377	21.69	3.84	3.61	4
Systemic learning	5	377	18.21	3.34	3.64	2
Course interaction	4	377	14.54	2.78	3.63	3
Equipment	4	377	15.51	2.86	3.87	1
Overall effectiveness	19	377	69.95	11.07	3.68	

4. Relationship between instruction website assessment and learning effectiveness

Table 6 summarized the results of correlation analysis. Correlation coefficient for the relationship between instruction website assessment and learning effectiveness was 0.64 ($p < 0.05$). Due to the moderate correlation, we suggested that highly-assessed instruction website made better learning effectiveness of students. Hypothesis one had been supported by the result. The correlation coefficients among factors of instruction website assessment and learning effectiveness were all positive. Teaching material and the structure was low-correlated with all the factors of learning effectiveness. Layout design was moderate-correlated with course interaction and low-correlated with the others. Interface design was low-correlated with equipment and moderate-correlated with the other factors. Interaction design and establishment of system configuration contributed to the learning effectiveness, with a moderate correlation with all of the factors.

Table 6: Correlation coefficients among factors of instruction website assessment and learning effectiveness

	teaching material and the structure	layout design	Interface design	Interaction design	establishment of system configuration	Website assessment
Instruction	0.33*	0.37*	0.47*	0.54*	0.47*	0.57*
Systemic learning	0.28*	0.38*	0.41*	0.49*	0.45*	0.52*
Course interaction	0.27*	0.44*	0.51*	0.55*	0.47*	0.58*
Equipment	0.33*	0.35*	0.37*	0.53*	0.43*	0.53*
Overall effectiveness	0.35*	0.45*	0.51*	0.61*	0.53*	0.64*

*$p < .05$

5. Explanation of learning effectiveness by website assessment

As shown in Table 7, there were three explanatory variables with significant F values. The order of the variables to add into the model was interaction design, establishment of system configuration and interface design. The ß coefficients of the three explanatory variables were positive and we could infer the extent of explained variance from the value of ß. Interaction design owned the largest explained variance while establishment of system configuration and interface design were the second and the least. The overall variance of learning effectiveness explained by the model was 44%. Interaction design, the variable with the best ability of explanation, accounted

for 38% of the overall variance. The result supported hypothesis two, which assumed that factors of instruction website assessment was able to predict learning effectiveness.

Table 7: Regression analysis of website assessment on learning effectiveness

	R	R^2	ΔR^2	F value	F change	ß coefficient
Interaction design	.61	.38	.38	225.65*	225.65	.36
Establishment of system configuration	.64	.41	.04	130.51*	22.43	.22
Interface design	.66	.44	.03	96.98*	18.02	.21

*p<.05

6. Pathway analysis of the website assessment of learning effectiveness
Figure 1 displayed the influence of instruction website assessment on learning effectiveness. There were two latent variables. The first latent variable was website assessment and it was constituted of five indicators, including teaching material and the structure, interface design, interface design, interaction design and establishment of system configuration. Another latent variable was learning effectiveness and made up of instruction, systemic learning, course interaction and equipment. In order to test the fit between model and data, we conducted an analysis of structural equation modeling with maximum likelihood method based on the data of 377 students.
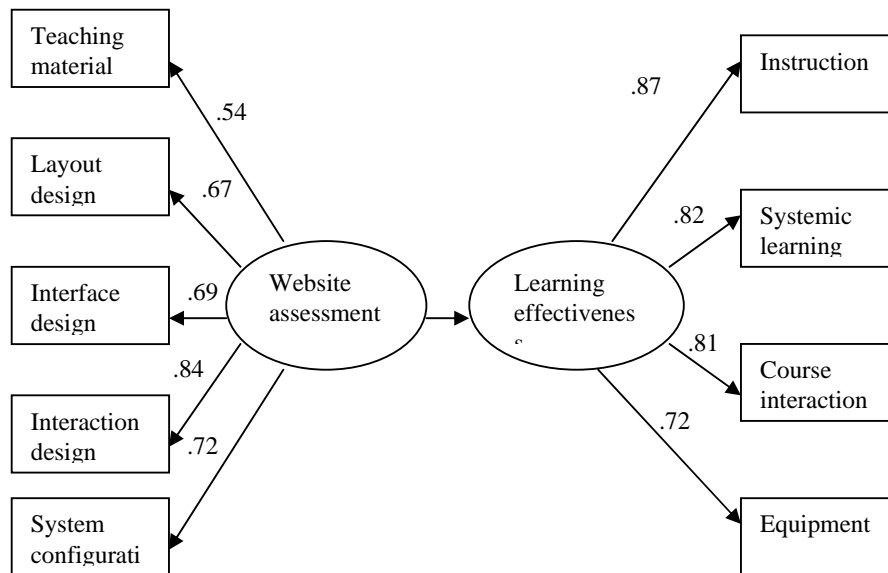
Figure 1: Factorial structure of the influence of instruction website assessment on learning effectiveness in pathway analysis

6.1 Overall model fit
Absolute fix indexes, relative fix indexes and parsimonious fix indexes were three common categories of indexes for evaluating overall model fit. The χ^2 was 83.71 with df=26, which reached the significant level of 0.01. However, it is easier for χ^2 to reach the significance standard in the situation of large sample size. Therefore, we need to take other indicators into consideration. Other indicators also implied significance of the effect: GFI=0.95, meeting the standard as > 0.9; SRMR=0.4 and RMSEA=0.7, both favoring the criteria as < 0.8. On the other hand, the relative fix indexes were all > 0.9; NNFI=0.95; CFI=0.97; RFI=0.93. The parsimonious fix indexes were also reach the requirement as > 0.5; PNFI=0.69; PGFI=0.7. The AIC value was 121.70 for assumed model, which was less than 1741.60 for independent model but larger than 90.00 for saturate model. In conclusion, three categories of indexes were all met and the overall model fit was satisfactory.

6.2 Fit of internal structure of model
Evaluating fit of internal structure of model contains two parts. The measurement model focuses on reliability and validity of variables while structural equation model emphasizes theory construction and cause-effect

relationship.

6.3 Measurement model validity and reliability

Bollen (1989) had pointed out that the values and significance of coefficients between latent variables and indicators, that is, factor loadings, could be used to assess the validity of each indicator (Huang, 2005). As Figure 1 displayed, the standardized factor loadings of the nine indicators on the two latent variables ranged from 0.54 to 0.87 and reached the statistical significance level at 0.01. As a result, all the latent variables could be properly measured by the indicators. The measurements of the variables were with good validity. Bagozzi & Yi (1988) stated that the reliability of each indicator should be larger than 0.5 (Huang, 2005). Among nine indicators in table 8, six indicators were demonstrating good reliability, with the values > 0.5 (reliability for each indicator: teaching material and the structure=0.29, layout design=0.44, interface design=0.47, interaction design=0.70, establishment of system configuration=0.51; instruction=0.75, systemic learning=0.67, course interaction=0.65, equipment=0.51). Despite of reliability for each indicator, Hair (1998) suggested researchers to check the composite reliability (CR) and average variance extracted (AVE) of the latent variables. The criteria were larger than 0.60 for the former and 0.50 for the latter (Huang, 2005). As website assessment was with CR=0.82 and AVE=0.49, learning effectiveness was with CR=0.88 and AVE=0.65. The criteria for CR and AVE were satisfied. According to the results of the above tests, our study was showing good fit for overall model and internal structure.

Table 8: Fit of internal structure of model

Latent variable	Indicator	Reliability for each variable (R^2)	Average variance extracted (AVE)	Composite reliability (CR)
Website assessment	Teaching material and the structure	.29	.49	.82
	Layout design	.44		
	Interface design	.47		
	Interaction design	.70		
	Establishment of system configuration	.51		
Learning effectiveness	Instruction	.75	.65	.88
	Systemic learning	.67		
	Course interaction	.65		
	Equipment	.51		

6.4 Structural equation model

We have mentioned the model for how instruction website assessment influences learning effectiveness in the previous section and the model held the hypothesis three which assumed a positive effect. The hypothesis three had been verified as the coefficient of the pathway from instruction website assessment to learning effectiveness was 0.75 and significantly positive (t=8.57, p<0.01). Therefore, we concluded that website assessment performed a direct effect on learning effectiveness.

CONCLUSION AND SUGGESTION
CONCLUSION
1. Teaching material and the structure was the main indicator of instruction website assessment

Vocational high school students saw teaching material and the structure as the most important property in assessing instruction websites. Interaction design, establishment of system configuration, layout design and interface design were relatively less emphasized. Similar to Chang (2005), practical teaching function was the crucial component of instruction websites and other special features could only play a subordinate role. In addition, the purposes of instruction websites assessment were to help students achieve the expected learning goals and to collect specific information for constructing an attractive websites with abundant interaction designs. With solid teaching material and structure, instruction websites could be a helpful media, providing flexible learning environments and encouraging active learning.

2. Improved equipment was the main learning effectiveness

Students perceived the equipment and environment as the most improved domain after assisting learning with instruction website. The other domains in learning effectiveness, including systemic learning, course interaction and instruction were less elevated. In Taiwan, information technology had overcome the limits of space and time. The wide-spread web offered on-line interactions among people, convenient ways of data collection and

communication accesses among teachers and students. Hence, students were satisfied with the equipment and environment due to well-developed web technology. Unlike equipment, instruction was the least improved domain of learning effectiveness. The possible reason was on-line teaching brought laziness in learning easily. When students were learning through internet, they must operate computers and start browsers. However, self-regulation of individual student was the key factor leading to the outcome of open learning (Hsiao et al., 2012; Liang, 2002). In the age of internet, information and education experts should work together to improve the learning effectiveness via providing an appropriate context of internet use.

3. The relationship between website assessment and learning effectiveness was positive. Interaction design explained the model best

The correlation coefficients among the five factors in website assessment and the four factors in learning effectiveness were all significantly positive. Layout design, interaction design and establishment of system configuration were even moderate-correlated with all the factors in learning effectiveness. As research of Webster & Hackley (1997) indicated, interaction design, which best explained the effect, improve the learning effectiveness of the students the most. Consequently, we could apply internet to instruction and display teaching materials in various forms by use of multimedia. We expect the application to create a new learning environment, compensate for the drawbacks of traditional teaching and improve the learning effectiveness.

SUGGESTIONS

1. Construct a professional assessment of instruction websites

In the review of international literatures, we found that the assessment of internet source played an essential role in on-line teaching. The academic assessment of on-line learning was the key to promotion of on-line teaching. Although on-line teaching has offered an abundant and convenient way of learning, it would become a shallow learning tool without objective assessment. In advance of comprehensive on-line teaching, a strict system or an independent department for internet assessment is in need.

2. Emphasize on-line teaching structure and formulate regulations

On-line teaching is a trend. The internet environment and learning attitude are important factors of on-line teaching. To improve the quality of learning, school should take the responsibility of educating students on the process and regulations of on-line teaching.

3. Future research

Due to insufficiency of time and human resource, the study population and school locations were constrained. For further research, we suggested to extend the study population to other age groups and try to include more locations. We also expected to find out more relative factors of instructional website assessment and learning effectiveness, which may make larger contributions.

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NURSING PROFESSIONALS' EVALUATION IN INTEGRATING THE COMPUTERS IN ENGLISH FOR NURSING PURPOSES (ENP) INSTRUCTION AND LEARNING

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ABSTRCT

This study was designed to examine the pre- and in-service nursing professionals' perceptions of using computers to facilitate foreign language learning as consideration for future English for nursing purposes instruction. One hundred and ninety seven Taiwanese nursing students participated in the study. Findings revealed that (1) the participants felt benefited using computers to aid their language learning mostly in reading skills development (ex. reading medical reports, doctor's orders, and English magazines and newspapers), followed by vocabulary skills (ex. acquiring more medical terminologies), listening skills (ex. listening to English broadcast media) and writing skills (ex. writing nursing notes/reports in real situations). They also expressed the computers provide "least" help as they try to become more proficient in speaking at seminars, making presentations and participating in groups discussions using English; (2) statistical significance was noted in terms of students' perceptions of computer-mediated learning in English speaking based on their division/rank using an ANOVA test; (3) a Pearson Product-Moment Correlation analysis revealed a statistically significant, positive association between participants' perceptions of using computer to facilitate language learning and their self-evaluation of their macro English proficiency. Based on these results, researchers and educators could find meaningful ways that will improve the attitudes of students in the digital learning environment, and continue to evaluate ways to help these students connect with the process of learning.

Keywords: Nursing education, English for nursing purposes, Computer-mediated learning/instruction

BACKGROUND & INTRODUCTION

A Changing Climate of Global Environment

Our societies have been muddled by the new movements of globalization, digital learning and communication, and World Englishes. These appear to be several major factors associated with a changing climate facing nurse education today.

Before the emergence of a new vehicular language or *lingua franca*, English remains dominant as a globe means of communication. As countries have become more and more open to one another and more culturally diverse as a result of a push for globalization, it has become much easier and affordable for citizens of the world to travel across borders, physically and/or via "cyberspace," to attain knowledge, for traveling pleasure, and to seek ample business ventures. Interestingly but not surprisingly, the numbers have suggested that more and more people cross borders just to seek better quality in medical service (sometimes at a more equitable price). This global phenomenon has given enough concrete support for English learning by the people of the countries that are in the bid for such alluring opportunities arriving from the overseas. This is particularly true for those who live in the non-English speaking countries, in which English is used as a foreign language, or EFL. Evidently, it is also clear that people who are proficient in English are advantageous over those who speak only their mother tongue.

Challenges Facing Nursing Communities

Some could argue that a booming nursing care industry might merely be a "sub-product" of the immense, international business conglomerates, but the consequences that the globalization force has brought about to this community is not at all secondary. Let's not be mistaken, medical institutions need to generate enough income in order to stay afloat, but making money is not their primary goal; instead, to save a life and continuously provide world-class care are. Hospital nursing professionals, clinical and student nurses have been acquiring knowledge and share resources globally. They need to bundle themselves up with arrays of skills to service a wider, and more international population and to cope with an increasing complex health system. English abilities inevitably remain in focus in nursing discipline because it helps better facilitate adequate exchange of information (communication) with the physicians and the patients, which further leads to proper diagnoses and care. As good knowledge and good communication are essential, nurse education, and nursing communities are faced with several dilemmas and challenges in terms of discipline-specific language learning and pedagogy (Kimball, 1998). At school, the majority of subject-specific textbooks and professional journals are written in English, though many more have been translated into local language(s) for better comprehension. In addition, many academic lectures are delivered via the means of English. Students are urged to read and write in English as they will be expected to do so in the future. Consequently, those who

receive more adequate language education/training can be a value added readiness as soon as they enter the workforce. At the work place, nursing professionals are counted on reading and following doctors' orders, writing nursing notes, and entering records, often times in English. Nurses who are proficient in English language can better address their patients' needs via effective communication. Both the student and in-service nurses recognize the necessity of English and how unequivocal important it is for professional success, better job opportunities, and updating their medical knowledge.

In the process of acquiring abilities and knowledge of the second language (SL) or foreign language (FL), similar to many other professional disciplines, English learners in the nursing communities often have to make switches between what have been described as the goal-oriented needs (Belcher, 2009; Kimball, 1998). That is, what they need to know with their knowledge in order to succeed in their school subjects and/or professional careers. The former is known as the EAP, English for academic Purposes and the later is known as the EOP, English for Occupational Purposes (Dudley-Evans & St. John, 1998). The best fitted EOP for nursing professionals is the English for Nursing Purposes, or ENP, that can be furthermore divided into pre-experience, in-service, and post-service types. Perceived needs and perceived effectiveness of the English language by the pre- and in-service professionals seem to have been driving the current research on English for Nursing Purposes.

Educational Uses of Computer Technology

It is not uncommon to see computer uses in disciplines such as foreign languages, mathematics and sciences, just to name a few. For instance, in an English composition class the computer can be used for providing and receiving useful and just-in-time feedback that can contribute to the quality of student writing. It can also be used for facilitating the process of writing so that students and teachers or students and students can interact with the content in meaningful ways that are difficult with pencil and paper in a traditional classroom (student engagement/ skill mastery). The technology used in linguistic expression, be that speech or text, is expanding our capabilities to interpret, understand and infer ideas in other symbol system (Kozma & Johnston, 1991). Taking advantage of today's virtual reality technology, students in Asia are able to take an interactive field trip (Yu, et al., 2008) to The Franklin Institute Science Museum in Philadelphia, Pennsylvania, USA, without having had to travel one-half way around the globe. Educational uses of technology cannot go unnoticed, and the list of technology coming to classrooms can't be overstated.

LITERATURE REVIEW
Computers and the Nature of Teaching/Learning

We stand in a period where electronic learning takes the helm of the society of knowledge, and in which computer technology has a defined impact on the direction of how teachers teach and how students learn. With a click on the mouse or a finger touch on the screen, lecture notes and instructional materials arrive in the palms of the receivers' hands. Students are getting accustomed to reading electronic texts on a e-reader or on a personal computer and have found themselves closer to home by sharing and exchanging files and scholastic ideas through familiarized instant messengers (IM), web blog, bulletin board systems (BBS), and/or, if not "the" most popular, social networks.

Because technology continues to advance in capacities and capabilities (Yu et al., 2008), the computer is gaining popularity in mainstream classrooms. Every day computers become more capable of storing, processing, and analyzing larger amounts of data faster and in a much more effective and organized manner. Teachers can easily craft and/ or edit their lesson plans and tests and can generate more complex yet meaningful student records with computers. By doing so they may even be able to cut down on the paper consumption! In addition, Yu et. al (2008) and Vogel & Klassen (2001) state that the adaptive nature of computer technology permits teachers to cater to students' learning needs, addressing a variety of learning styles and abilities. Software companies have also been striving to produce more affordable, yet high-quality programs to meet the needs in a diverse environment. Teachers who teach with technology seem to be able to better promote the emerging educational trends of collaborative (partnering) learning, cooperative learning, and autonomous (individualized) learning (Annand & Haughey, 1997; Kozma & Johnston, 1991; Vogel & Klassen, 2001; Wheeler, 2001).

Apart from providing knowledge and enabling students to explore their various interests, one of the primary purposes of school education is to strengthen students' readiness for the ever-changing world; i.e, preparing them to be proficient and knowledgeable workers upon entering the workforce. Employees of today are expected to be skilled in a world of communication that includes conferencing systems, the World Wide Web (WWW) and electronic mail (Roche, 2000). Employees are also required to exhibit on their jobs creativity and higher-level cognitive skills such as analytical, summative, and critical thinking skills (Knapper, 1995, as cited in Knapper, 2001). It is often said and heard that the "real" world outpaces the classroom with shifts in technology, paradigms and resources for learning (Vogel & Klassen, 2001). Knapper (2001) agrees with Vogel

& Klassen when he states that content knowledge and skills learned in school sometimes become obsolete even before students graduate. To combat this claim and the increased challenges faced by higher education, teachers need to think of ways to bridge and/or close the gap and to produce more capable and effective learners. One possible way of addressing this gap is the integration of technology in teaching.

Computer-Facilitated Language Learning

Computer-based language learning can be traced back to the 1970s, when a number of language teachers used computers as mechanical or language trainers to enhance students' grammar and lexical skills (Warschauer & Healey, 1998). For example, after a lesson has been taught in a writing class, language instructors might ask students to review and reinforce the knowledge they have learned in class and practice a certain rule of grammar or sentence structures of the target language alone or with their peers by using computers or other technology devices. Many researchers (Ahmad, Corbett, Rogers, & Sussex, 1985) referred to this teaching method as drill and practice method or behavioristic approach. This model was advocated at that time because proponents believe that learning occurs through reiteration and repetition. By using language learning software as the "supplementary source", students were able to practice lessons as frequently as needed. In the early 1980s, technology and personal computers became more accessible and affordable to most people; educators (e.g., Phillips, 1987 & Underwood, 1984) believed that computer-mediated language learning for instructions should be used more widely in language classrooms. According to Girard, Mandera and Marchini (2001), computer-mediated language learning can be defined as a strategy of learning combined with technology, and language application software to enhance learners' language proficiency by allowing students to manipulate utterances, encourage problem-solving skills, and create simulated learning environments through Internet service providers. Second language learning needs to be integrated with the computer because it promotes (1) learning with vast language data, (2) simulates real-life situations, (3) encourages interaction in class, and (4) promotes individualization in a large class (Warschauer & Healey, 1998). Lai and Kritsonis explained that computer-mediated language instruction can also (a) improve practices for students through experiential learning, (b) encourage learning motivation, (c) enhance student achievement, (d) increase authentic materials for study, (e) encourage greater interaction between teachers and students and students and peers, (f) emphasize individual needs, and (g) enlarge global understanding" (Lai and Kritsonis, 2006, p. 1). Jones, Fortescue and Phillips (as cited in Warschauer, 1996) suggested that when designing computer-mediated activities for language learners, teachers should "teach grammar implicitly rather than explicitly and use the target language as the primary language in class". (p. 57). Despite some of the disadvantages and challenges of using technology and computers as supplementary learning tools in teaching, educators believe that technology and computer-mediated learning instruction help language learners to discover the target language at their own pace and have the potential for promoting communication and teamwork among students (Chen, 1995; Cavalier & Klein, 1998). As technology becomes more advanced, many ESL instructors are now incorporating language lessons with multiple media into their classrooms. Yu, Williams, Lin, & Yu (2007) revealed that "the potential of multimedia is to foster the level of interactivity as a form of learning and to offer many possibilities for enriching the knowledge" (p.219). As Teririll (2000) stated "[English as a second or other language] ESOL teachers and learners across the country are integrating computers, Internet and multiple media with ESOL instruction. The world has changed because of the Internet [and other electronic devices] and ESOL has changed with it" (p. 2).Using computers and multimedia, such as Internet, web page and streaming audio, with a web-based instruction, provide a learning environment that facilitates positive interdependence and collaborative team work for students (Lee, 2000). As Bahaa El Din (1997) stated:

> Achieving the goals of development will necessitate preparation of a new cadre of professionals who are able to interact with the language of this age, and with the technology of the Information and Communications Revolution….Therefore technological training should start at an early age and should include all aspects of education (p.120-121).

Thus, to achieve the literacy of a second language, using technology in learning a language will be an important component for language learners. Internet and multimedia will be the tools to support their linguistic skill and knowledge structure (Kasper, 2002).

The usefulness of computer-mediated language learning to second language learners in education has been widely studied. In 2003, Zha et al.(2006) examine ESL learners' communicative competence in a computer-mediated language learning environment. They used both qualitative and quantitative statistical methods to analyze 956 electronic discussion messages that were posted by those elementary ESL students. The results of this study suggested that electronic discussion boards can be used to promote language learners' writing skill as well as the target language usage. Kang (1995) conducted a study on the effectiveness of different instructional approaches on Korean students' English vocabulary learning. The results indicated that students performed significantly higher in a retention test when using a computer-based context instructional approach and concluded that a computer-mediated learning environment would enhance learners' vocabulary learning.

Warschauer (1996) concluded that "electronic discussion can be a good environment for fostering use of more formal and complex language, both lexically and syntactically" (p. 22). The World Wide Web (WWW) and electronic mail (e-mail) communication media also have a tremendous impact on enhancing students' language competency. In 1996, Rosen conducted a study on how students used computers with Internet access as the language learning medium to improve their English language proficiency. The result indicated that students using the Internet as a primary tool in learning English scored slightly higher on the TOEFL test compared to students using the direct instruction method in learning English. Wang (1996) investigated the effectiveness of using e-mail as a writing tool for dialogue journaling. Fourteen students who were enrolled in intermediate level reading and writing class participated in this study. The findings indicated that students in the e-mail group generated more language functions in each writing session than students in the paper-and-pencil group and concluded that using e-mail as a language learning tool facilitates language learning.

Even if some might argue, the teaching of English for Specific Purposes is well developed in the Western countries. In non-English speaking countries, there has been a recent increase in the number of higher education institutions and in increase in the number of students attending there institutions. This increase in the number of university structures, especially of scientific and technological expertise, is not accompanied by any development in teaching programs, and in particular as pertains to the teaching of English for Specific Purposes. The current situation regarding the teaching of this specialty at vocational or technical faculties in the non-literary institution is characterized especially by a lack of human recourses and adequate teaching material (Harrabi, 2010). In a what is typically regarded as a medical/nursing science oriented academic institution, very little time is available for English courses. The primary goal of teaching/learning English is to enable students to read medical and/or scientific texts written in English. Thus, the reading skill is always the most emphasized, whereas the writing skill is ranked second, listening skill being the third, and the least attended speaking skill.

Since the nature of computer technology has granted enormous as well as exciting opportunities for health care education, it is imperative for us to investigate English learners can make effective of computer technology for their academics that further leads to much more successful careers.

Purpose of the Study
This study was designed to provide insight into how pre- and in-service nursing professionals' demographic profiles contributed to their perceptions of computer-mediated language learning, how participants' perceived effectiveness of computer-mediated learning impacted their English learning, and how self-evaluation of English proficiency impacted their perceptions of using the computer to facilitate language learning.

Research Questions
The researchers sought answers to these following questions:
1. How is computer mediated language learning perceived by the participants in terms of their demographic variables?
2. Are there any meaningful relationships between students' perceptions of computer facilitated learning and computer facilitated *language* learning?
3. Are there any significant differences in students' perceptions of computer facilitated language learning based on demographics?
4. Are there any meaningful relationships between participants' perceptions of using computer to facilitate language learning and their self-evaluation of their macro English proficiency?

METHODOLOGY
Research Design
This quantitative study involved a combination of descriptive and correlational research. A descriptive design was used to identify the differences in the student participants' overall perceptions of computer facilitated teaching/learning and their perceptions of using computer technology to facilitate language learning. A correlational (associational) design was also used to help investigate the possible relationships between the variables under study. In this study, the variables were: 1. participants' demographics, 2. participants' overall perceptions of computer facilitated teaching/learning, 3. participants' perceptions of using computer to facilitate language learning, and lastly, participants' self-evaluation of their macro English proficiency.

Sampling of the Participants
The accessible student population (classes) for the study was approximately 2000 nursing major students enrolled in a regional campus of Taiwanese Nursing Institute. These students were fairly evenly divided into 40 classes, 22 classes of which will be 4-year and 2-year college students and the remaining 18 classes will be continuing education students. The researchers used a random sampling technique to select a total of six (6) classes for the study. Among which, three (3) classes were selected out of the first 22-class pool and the other three (3) were from the 18-class pool. The reason for such selection was to ensure equal representations of the

two groups. The researchers visited each selected class and asked all students for their voluntary participation. In the end, 197 students participated in this study, accounting for approximately 1/10 of the overall population. The participants varied in their age, the length of their professional work experience, experience of using computers for language learning, and were at different stages of their degree, as far as their class rank was concerned.

Instrumentation

A fairly large scale self-report survey was used to collect data for this study (see Appendix A). The instrument was developed by the researcher based on information obtained from the review of literature in the area of computer-facilitated instruction/learning (Mazdayasna & Tahririan, 2008; Kenny, 2000; Kern, 2006; Kimball, 1998), using the four abovementioned research questions as a guide:

The questionnaire was made available monolinqually in student's native language, Mandarin Chinese in order to avoid receiving any false response due to misinterpretations of the item(s). It contained 47 itemized descriptions that are made up of a number of sections:

First section included a mix of multiple-choice and open-ended questions. Participants was asked to specify demographic variables such as gender, age, class rank, grade point average (GPA), employment status, their experience in computer use for learning.

The remaining questions were in five-point Likert scale format, with number 1 being Strongly Disagree (SD) , number 2 being Disagree (D), number 3 being Agree (A), number 4 being Strongly Agree (SA), and Not Applicable (NA). Subsequent sections measured the perceptions of computer-facilitated teaching/learning, the perceptions of using computer technology to facilitate language learning in the area of English Listening, Speaking, Reading, Writing, and Vocabulary learning. Last section asked the students to self-evaluate of their macro English proficiency.

Validity and Reliability of the Instrument

In order to establish the content (face) validity of the instrument, which was stated by Gay, Mills, & Airasian (2006) as the instrument measuring what it is intended or what it claims to measure, the researchers presented it to a panel of experts, who were asked to validate the content of the survey instrument by ensuring the overall inclusiveness of all the variables under investigation and to verify that it addressed all the research questions. The experts were also asked to review the survey for things such as unclear instructions, confusing, ambiguous or repetitive items, and overly complex or difficult sentence structure. The researchers then revised the instrument based on the constructive feedback received from the reviewers.

To establish the reliability of the survey instrument used, the researchers employed a test/retest method using 25 students, the number of students in a regular class size. These students were not the subjects for this reported study. The identical survey was completed by the participants twice. There was a waiting window of one week between the first and second administration of the instrument. In addition to the test/retest method, the researchers also performed Cronbach's Alpha reliability test. Cronbach's Alpha values for various sections of the instrument ranged from 0.82 to 0.91.

Data Collection, Procedures & Analyses

The researchers asked students in the selected classes to participate in the study. Upon arrival to each class, the researchers introduced themselves, explained the purpose of the visit, emphasized that participation was totally voluntary, and then administered the questionnaire to the participants. Voluntary participation was ensured both through explicit verbal and written explanations. The participants could withdraw from the study at any time and that their participation would in no way influence their academic standing in the class where the questionnaires were distributed. Participants were informed verbally and in writing that they could decline to answer any items on the questionnaire. The subjects gave their consent by completing and returning the questionnaire. Data analyses included the used of summary descriptive statistics, cross tabulations, test for equality of variance, t tests, correlations, ANOVA and post hoc tests.

FINDINGS

Survey Responses

A total of 240 students were enrolled in the selected classes. Among which, 197 students participated in the time of the study, resulting in a participation rate of 82%.

Description and Computation of Scores for the Scale

The researcher used a five-point Likert scale to collect participants' responses for a number of sections in the survey instrument (Appendix A). A Likert scale was used to allow the participants to express their perceptions in the areas under investigation. The Likert scale used in the study is shown in Table 1.

Table 1. The Five-Point Likert Scale Used for College Students' Perceptions of Computer-Mediated Instruction/Learning

Five-Point Likert Scale	
Scale	Description
1	Strongly Disagree
2	Disagree
3	Agree
4	Strongly Agree
-	Not Applicable (response ignored)

In this study, the means for Likert scale items were interpreted using the scale shown in Table 2.

Table 2. Interpretation of Likert Scale Mean Score Values

Interpretation of Mean Score Values	
Scale	Description
1.00-1.49	Strongly Disagree
1.50-2.49	Disagree
2.50-3.49	Agree
3.50-4.00	Strongly Agree

Demographic Information

Gender

As shown in Table 3, mass majority of the participants were female nursing students, accounting for nearly 93% and as shown in Figure 1; the majority of the participants were less than 23 years old.

Table 3. Frequency and Percentage Analysis of the Participants by Gender

Gender	Frequency	Percentage (%)
Male	14	7.10
Female	183	92.90
Total	197	

Age

As shown in the Table 4, the youngest participant was 18 years old, with the oldest participant being 32. The mean age of the students in this study was 20.56 years with a standard deviation of 0.55 years. Figure 1 illustrates the number of students grouped by age.
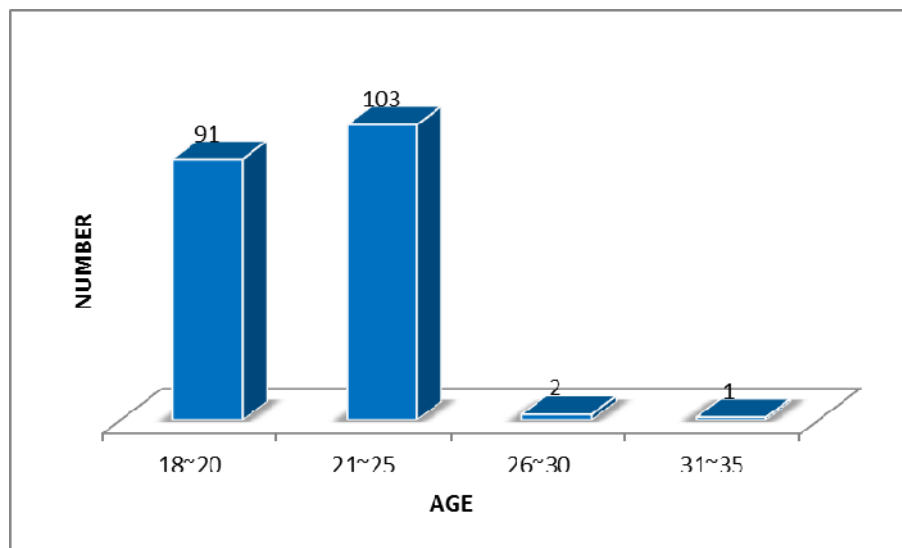
Figure 1. Number of Participants Grouped by Age

Table 4. Descriptive Statistics Based on Age

N	Minimum	Maximum	Mean	Std. Deviation
197	18	32	20.56	0.55

As shown in Table 5, three quarters of the participants were 4-year college students, and less than a quarter of them were continued education students. Most of the participants as shown in Table 6, maintained cumulative grade point average (CGPA) of As or Bs.

Table 5. Frequency and Percentage Analysis of the Participants by Division/Rank

Division/Rank	Frequency	Percentage
4-yr College Freshmen	49	24.90
4-yr College Sophomores	36	18.30
4-yr College Juniors	34	17.30
4-yr College Seniors	32	16.20
Continued Education	46	23.40
Total	197	

Table 6. Frequency and Percentage Analysis of the Participants by CGPA

CGPA	Frequency	Percentage
A- 80 and up	137	69.50
B- 70~79	54	27.40
C- 60~69	6	3.10
Total	197	

Figure 2 shows that nearly all of the participants were full time students and one tenth of the participants were employed either full-time or part-time as nurses. Most of them had worked in the range of 0~5 years (see Table 7). More than greater half of the participants indicated that they had experience using computers in a teacher/learning environment (Table 8).
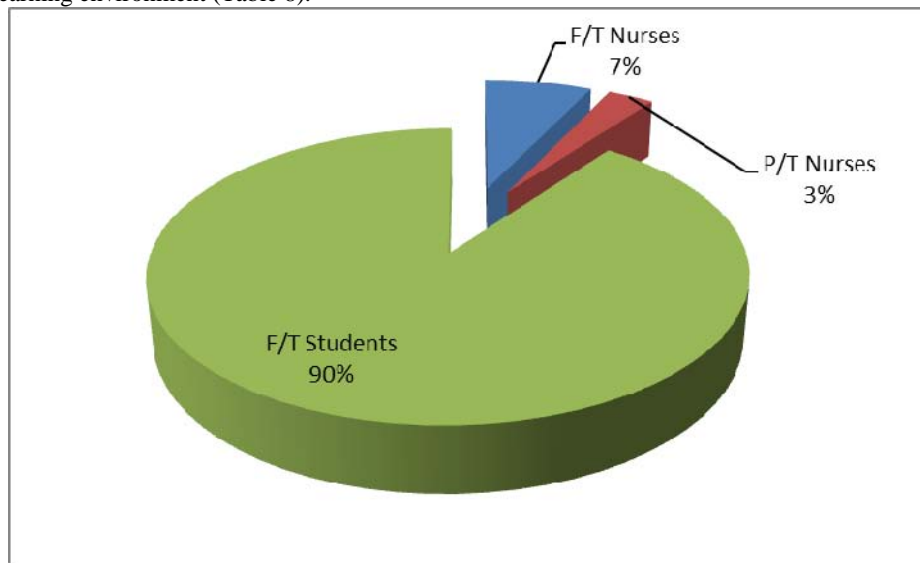
Figure 2. Frequency and Percentage Analysis of the Participants by Employment as Nurses

Table 7. Frequency and Percentage Analysis of the Participants by Length as Nurses

Length as Nurses	Frequency	Percentage
0~5 years	195	99.00
6~10 years	1	0.50
11~15 years	1	0.50
Total	197	

Table 8. Frequency and Percentage Analysis of the Participants by Length Using Computers for Learning

Length Using Computers	Frequency	Percentage

0~5 years	43	21.80
6~10 years	105	53.30
11~15 years	38	19.30
16~20 years	10	5.10
20+ years	1	0.50
Total	197	

Research Question 1: How is computer mediated learning perceived by the participants in terms of their demographic variables?

Table 9 shows the descriptive statistics of the participants' perceived effectiveness of computer-mediated learning based on gender. The mean scores were 3.20 (male) and 3.21 (female), indicating the participants in the study "agreed" that overall computer-mediated learning was effective.

Table 9. Descriptive Statistics of the Participants' Perceived Effectiveness of Computer-Mediated Learning Based on Gender

Gender	N	Mean	SD	Min.	Max.
Male	14	3.20	.38	2.50	4.00
Female	183	3.21	.45	1.00	4.00
Total	197				

Table 10 shows the descriptive statistics of the participants' perceived effectiveness of computer-mediated learning based on age. The mean scores ranged from a low of 3.18, to a high of 3.83, indicating the participants of all age groups in the study "agreed" to "strongly agreed" that overall computer-mediated learning was effective.

Table 10. Descriptive Statistics of the Participants' Perceived Effectiveness of Computer-Mediated Learning Based on Age

Age	N	Mean	SD	Min.	Max.
18~20	91	3.18	.38	2.33	4.00
21~25	103	3.23	.50	1.00	4.00
26~30	2	3.83	.24	3.67	4.00
31~35	1	3.50	-	3.50	4.00
Total	197				

Tables 11 to 13 show the descriptive statistics of the participants' perceived effectiveness of computer-mediated learning based on rank, CGPA and employment as nurses. The mean scores ranged from a low of 3.12, to a high of 3.33, indicating the participants in the study "agreed" that overall computer-mediated learning was effective.

Table 11. Descriptive Statistics of the Participants' Perceived Effectiveness of Computer-Mediated Learning Based on Division/Rank

Rank	N	Mean	SD	Min.	Max.
Freshmen	49	3.19	.38	2.50	4.00
Sophomore	36	3.12	.39	2.33	4.00
Junior	34	3.33	.58	1.00	4.00
Senior	32	3.26	.47	2.17	4.00
Continued Education	46	3.20	.42	2.33	
Total	197				

Table 12. Descriptive Statistics of the Participants' Perceived Effectiveness of Computer-Mediated Learning Based on Cumulative Grade Point Average (CGPA)

CGPA	N	Mean	SD	Min.	Max.
A- 80 and up	137	3.22	.44	2.17	4.00
B- 70~79	54	3.20	.49	1.00	4.00
C- 60~69	6	3.19	.25	2.83	3.50
Total	197				

Table 13. Descriptive Statistics of the Participants' Perceived Effectiveness of Computer-Mediated Learning Based on Employment as Nurses

Employment	N	Mean	SD	Min.	Max.
Full-Time Nurses	14	3.21	.39	2.67	4.00
Part-Time Nurses	6	3.30	.48	3.00	4.00
Full-Time Students	177	3.21	.45	1.00	4.00
Total	197				

Table 14 shows the descriptive statistics of the participants' perceived effectiveness of computer-mediated learning based on length working as nurses. The mean scores ranged from a low of 3.21, to a high of 3.67, indicating the participants of all GPA groups in the study "agreed" to "strongly agreed" that overall computer-mediated learning was effective.

Table 14. Descriptive Statistics of the Participants' Perceived Effectiveness of Computer-Mediated Learning Based on Length as Nurses

Length	N	Mean	SD	Min.	Max.
0~5 years	195	3.21	.45	1.00	4.00
6~10 years	1	3.67	-	3.67	3.67
11~15 years	1	3.50	-	3.50	3.50
Total	197				

Table 15 shows the descriptive statistics of the participants' perceived effectiveness of computer-mediated learning based on length of using computers for learning. The mean scores ranged from a low of 2.92, to a high of 3.25, indicating the participants in the study "agreed" that overall computer-mediated learning was effective.

Table 15. Descriptive Statistics of the Participants' Perceived Effectiveness of Computer-Mediated Learning Based on Length Using Computers for Learning

Length Using Computers	N	Mean	SD	Min.	Max.
0~5 years	43	3.23	.42	2.50	4.00
6~10 years	105	3.25	.41	2.17	4.00
11~15 years	38	3.17	.49	2.33	4.00
16~20 years	10	2.92	.72	1.00	3.50
20+ years	1	3.00	-	3.00	3.00
Total	197				

Research Question 2: Are there any meaningful relationships between students' perceptions of computer facilitated learning and computer facilitated language learning?

Perceived Effectiveness of Computer-Mediated Learning
Table 16 shows the overall mean score of students' responses for item Nos. 8 through 13 in the Appendix A, which were used to assess the participants' perceived effectiveness of computer-mediated learning. As shown in the table, students in general held an "agreed" (M = 3.21, SD = .45) view of the overall effectiveness of computer-mediated learning.

Table 16. Overall Mean Score of the Participants' Perceived Effectiveness of Computer-Mediated Learning

	N	Mean	SD	Min.	Max.
Perceived Effectiveness of Computer-Mediated Learning	197	3.21	.45	1.00	4.00

Perceived Effectiveness of Computer-Mediated Language Learning

Table 17 shows the overall mean score of students' perceived effectiveness of computer mediated language learning. As shown in the table, students in general held an "agreed" (M = 3.23, SD = .40) view of the overall effectiveness of computer-mediated learning.

Table 17. Overall Mean Score of the Participants' Perceived Effectiveness of Computer-Mediated Language Learning

	N	Mean	SD	Min.	Max.
Perceived Effectiveness of Computer-Mediated Language Learning	197	3.23	.40	1.00	4.00

Table 18 shows the Pearson Product- Moment Correlation of students' perceived effectiveness in the area of computer-mediated learning and computer mediated language learning ($r = .55$, p. $< .01$). The result revealed that there was a statistical significant, *moderate* positive association between the two variables.

Table 18. Pearson Product-Moment Correlation of Students' Perceived Effectiveness of Computer-Mediated Learning and Computer-Mediated Language Learning

Variables	Computer Mediated Learning
Computer-Mediated Language Learning	.55*

* Correlation is significant at the .01 level (2-tailed).

Research Question 3: Are there any significant differences in students' perceptions of computer facilitated language learning based on demographics?

An independent sample T-test did not reveal a statistical significant difference between male students and female student, $t(197) = 0.116$, $p > .05$, for survey Items intended to solicit male and female students' perceptions about computer facilitated language learning. Their mean scores nearly stood identical (Male=3.24 vs. Female=3.23).

Table 9 shows the descriptive statistics of the participants' perceived effectiveness of computer-mediated learning based on their grade point average (GPA). The mean scores ranged from a low of 2.83, to a high of 3.38, indicating the participants of all GPA groups in the study agreed that overall computer-mediated learning was effective.

Table 19. Descriptive Statistics of the Participants' Perceived Effectiveness of Computer-Mediated Language Learning Based on Division/Rank

Division/Rank	N	Mean	SD	Min.	Max.
4-yr College Freshmen	49	3.01	.40	2.00	4.00
4-yr College Sophomores	36	3.04	.42	2.20	4.00
4-yr College Juniors	34	3.33	.61	1.00	4.00
4-yr College Seniors	32	3.25	.52	2.00	4.00
Continued Education	46	3.07	.49	1.00	4.00
Total	197				

Table 20 shows the result of the homogeneity of variance assumption for the participants' perceived effectiveness of computer-mediated learning in English *speaking* based on division/rank. The test score indicated that the assumption was not violated with $p. > .05$.

Table 20. Test Score for the Homogeneity of Variance Assumption of the Participants' Perceived Effectiveness of Computer-Mediated Learning in English Speaking Based on Division/ Rank

Levene's Test Statistic Based on GPA	p
1.49	.208

As illustrated in Table 21, a one-way analysis of variance (ANOVA) was used to examine if there were significant differences of participants' perceived effectiveness in computer-mediated learning in English speaking among groups based on their division/rank. The results indicated that there was a significant difference among groups $F (4, 192) = 3.08$, $p. < .05$.

Table 21. ANOVA Test of Participants' Perceived Effectiveness of Computer-Mediated Learning in English Speaking Based on Division/Rank

Source of Variation	Sum of Squares	df	Mean Square	F	p
Between Groups	2.94	4	.74	3.08	.02*
Within Groups	45.95	192	.24		
Total	48.89				

*p ≤ .05.

In order to identify where the difference identified by the ANOVA occurred, the researcher performed a Tukey HSD post hoc test shown in Table 22. The test revealed that freshman students were significantly different (M = 3.01), from junior students (M = 3.33). Students with higher rank tended to perceive higher the overall effectiveness of Computer Mediated Learning in English speaking than students with lower rank.

Table 22. Post Hoc Test (Tukey HSD) of Participants' Perceived Effectiveness in Computer-Mediated Learning in English Speaking Based on Division/Rank

Base Group	Base Group Mean	Compare Group	Compare Group Mean	Mean Difference	*p*
Junior	3.33	Freshman	3.11	.22*	.03

*p. ≤ .05.

Research Question 4: Are there any meaningful relationships between participants' perceptions of using computer to facilitate language learning and their self-evaluation of their macro English proficiency?

Perceptions of Using Computers to Facilitate Language Learning

Table 17 above illustrates the mean score of students' responses items that were used to assess their perceptions of using computers to facilitate language learning.

Self-Evaluation of Macro English Proficiency

Table 23 shows the overall mean score of students' responses for item that asked students to self-evaluate their macro (Listening, Speaking, Reading, Writing & Vocabulary skills) English proficiency. As shown in the table, students in general held a "Disagreed" or "Conservative" view (M = 2.45, SD = .68).

Table 23. Overall Mean Score of Students' Self Evaluation of Their Macro English Proficiency

Variable	N	Mean	SD	Min.	Max.
Self-Evaluation of Their Macro English Proficiency	197	2.45	.68	1.00	4.00

Table 24 shows the Pearson Product- Moment Correlation between each question item of the two variables (*r* = .28, p. < .01). The result revealed that there was a statistical significant, *low* positive association between the two variables.

Table 24. Pearson Product-Moment Correlation of the Perceptions of Using Computers to Facilitate Language Learning and Self Evaluation of Macro English Proficiency

Variables	*Perceptions of Using Computers to Facilitate Language Learning*
Self-Evaluation of Macro English Proficiency	.28*

*Correlation is significant at the .01 level (2-tailed)

DISCUSSION & CONCLUSIONS

This study adds to the literature that the results showed that the participants agreed that communication is enhanced in a computer-mediated instruction/learning environment. In terms of their perceived effectiveness of computer-mediated learning, the participants overall agreed that effective computer-mediated learning requires students to become encourages collaborative learning, as well as enables effective communication with the teacher and peers.

ANOVA analyses did not reveal any significant differences based on gender. It might be interpreted that there were no variant views about the effectiveness of computer-mediated teaching/learning among the participants in this female predominant (93%) industry. No significant differences were found among groups of employment as nurses and length working as nurses may have suggested that the great majority (90%) of the participants were full time students in school. Even the remaining had been employed as either full-time or part-time nursing workers, almost all had accumulated experience of less than 5 years.

It is worth noting that ANOVA analyses showed statistically significant differences on students' perceptions of computer mediated learning in *English Writing* based on their Division/Rank, *F* (11, 185) = 1.73, *p.* < .05). Differences were also recorded of their views of computer mediated learning in *English Speaking* based on GPA, *F* (11, 185) = 1.86, *p.* < .05). However, post hoc tests were not carried out after the results of the homogeneity of variance indicated that such the assumption was violated *p.* < .05.

This study also supports researchers' claims that conducting classes in a computer-mediated learning environment can effectively facilitate students' knowledge construction (Bentley, 2003) and that adequate use of computer technology can strengthen learners' higher cognitive skills and complex thinking skills (Rakes,

Fields & Cox, 2006) by providing significant evidence via students' responses agreeing that effective computer-mediated learning allows knowledge building (that helps relate facts to reality) and promotes in-depth and advanced learning. This finding also supports Cooper & Hirtle's (1999) observation as they reported that through a constructivist pedagogical approach, students could not only obtain the intended skills but in addition, acquire other skills necessary to solve the real world problems.

This study adds to the literature that there was a statistically significant, moderate positive association between students' perceived effectiveness of computer-mediated learning and computer mediated language learning. Correlational analyses between individual items of the two variables revealed that this association especially holds true between students' views of computer mediated learning and their believing that effective computer-mediated learning provides best help in the area of *English Listening*.

More specifically, itemized correlational analyses indicated a statistically significant positive association between "Computer mediated teaching/learning enhances the conventional face-to-face classroom experience" and "With the help of the computer technology, I think I can become more proficient in English in listening to instructions in real situations (hospitals/clinics)." Similarly, the study found a significant positive association between "Computer mediated teaching/learning enables effective communication with the teacher and peers" and "With the help of the computer, I think I can become more proficient in English in listening to patients, colleagues, and fellow students." The possible explanations for the findings could be that the computers help stretch teaching/learning as well as communications beyond conventional classrooms. Aside from acquiring additional benefits and skills which were not intended for the purpose of the class(es), students are likely to choose more authentic learning tasks that are especially related to academics and practices.

Statistically significant, positive relationships were found between participants' perceptions of using computer to facilitate language learning and their self-evaluation of their macro English proficiency. Further correlational analyses revealed that computer mediated learning in English *writing* received the highest correlational scores whereas computer mediated learning in English *reading* had the lowest score, suggesting that the higher the participants' rated their own English abilities, the more they believe that the computer can facilitate more successful English learning in writing. The likelihood shifted downward in the case of English reading.

The mean score (M=2.45, "Disagree") for students' self-evaluation of their macro English proficiency was quite significantly lower than that in other categories, perceptions of computer mediated learning (M=3.21) and perceived effectiveness of computer mediated language learning (M=3.23), respectively. One possible explanation for this tangible finding was that students in Southeast Asia have always been taught to be humble or not to be overly confident. On the flip side of the coin, it might well be that students were simply too unconfident to manifest their true English abilities.

In summary, many factors other than those presented in this study might and could influence students' perceptions, as well as their perceived effectiveness of computer-mediated instruction/learning. It takes explicit knowledge, support and cooperative efforts among administrators, teachers and students to ensure teaching and learning are indeed benefitting from the computer technology.

LIMITATIONS

The findings of this research are limited in the following ways:
1. The study procedures involved the self-reporting technique. Thus findings may be affected by participants' physical and emotional state, honesty, accuracy and thoroughness in completing the survey.
2. The findings of this study are limited by both students' and teachers' unique computer background, their direct access to and the availability of the computer technology in their respective major program areas, including computer hardware and software, and peripheral equipment.
3. Students' perceptions are limited to the information obtained from the instrument used in this study and the validity and reliability of the instrument.
4. Interviews with the English instructors allows the interviewees to more openly and freely express their perspectives concerning the benefits and disadvantages of computer facilitated language learning, the role(s) of the teacher and the student in a computer technology mediated teaching/learning environment as well as exploring the attitude and expectations of the participants regarding future trend of English instruction.
5. Interview questions are prepared to personally elicit information regarding interviewees' perspectives concerning the benefits and disadvantages of computer facilitated language learning, the role(s) of the teacher and the student in a computer technology mediated teaching/learning environment as well as exploring the attitude and expectations of the participants regarding future English for Specific Purpose (ESP), most specifically, English for Nursing Purposes (ENP) instruction.

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Appendix A: Students' Questionnaire

Dear Participants:

Please read the following description for each item and provide your response by checking (✓) the box that best reflects your opinion and/ or writing down your response in the space provided.

Section A: Demographic Information

1. What is your gender?

   ☐ Male   ☐ Female

2. What is your age? (Please specify) _____

3. What is your class rank and what primary academic division do you belong?

   ☐ 4-Yr College Freshman   ☐ 4-Yr College Sophomore   ☐ 4-Yr College Junior

   ☐ 4-Yr College Senior   ☐ 2-Yr College 1st year   ☐ 2-Yr College 2nd year

   ☐ Continued Education – 1st year   ☐ Continued Education – 2nd year

   ☐ Continued Education – 3rd year   ☐ Graduate – Master's

   ☐ Non-Degree

4. What is your cumulative Grade Point Average (GPA)? _____

5. Are you currently employed as a nurse?

   ☐ Yes, full time   ☐ Yes, part time   ☐ No

6. How long you have been working as a nurse? (check 0-5 years if answered "No" in item 7)

   ☐ 0 - 5 years   ☐ 6 - 10 years   ☐ 11 - 15 years

   ☐ 16 - 20 years   ☐ 20 years +

7. In general, what is your experience (number of years) of using computer for learning?

   ☐ 0 - 5 years   ☐ 6 - 10 years   ☐ 11 - 15 years

   ☐ 16 - 20 years   ☐ 20 years +

Instructions for Section B through D:

Please read the following description for each item and provide your response by *circling* the number that best reflects your opinion from **1- Strongly Disagree (SD)**, **2- Disagree (D)**, **3- Agree (A)**, **4- Strongly Agree (SA)**. *Check* (✓) **"Not Applicable (NA)"** if any of the statements does not apply to you. Limit ONLY ONE response to each question please.

Section B: Perceptions of Computer Facilitated Teaching/Learning

No.	Items	SD	D	A	SA	NA
8	To me, computer facilitated teaching/learning is the use of the computer technology to enhance the conventional face-to-face classroom experience.	1	2	3	4	
9	To me, a computer facilitated teaching/learning environment requires students to be active participants.	1	2	3	4	

10	To me, I think effective computer facilitated teaching/learning enables effective communication with the teacher and peers.	1	2	3	4	
11	I think effective computer facilitated teaching/learning encourages collaborative (group) learning.	1	2	3	4	
12	I think effective computer facilitated teaching/learning allows knowledge building (that helps relate facts to reality).	1	2	3	4	
13	I think effective computer facilitated teaching/learning ensures that students are engaged and motivated in learning (the given subject).	1	2	3	4	

Section C: Perceptions of Using Computer Technology to Facilitate Language Learning

Listening Skills

With the help of the computer technology, I think I can become more proficient in English in:					
No.	Items	SD	D	A	SA	NA
14	listening to lectures	1	2	3	4	
15	listening to conversations on general topics	1	2	3	4	
16	listening to group presentations in class	1	2	3	4	
17	listening to instructions in real situations (hospitals/clinics)	1	2	3	4	
18	listening to patients, colleagues, and fellow students	1	2	3	4	
19	listening to English broadcast media	1	2	3	4	

Speaking Skills

With the help of the computer technology, I think I can become more proficient in English in:					
No.	Items	SD	D	A	SA	NA
20	questioning and answering in class	1	2	3	4	
21	participating in group discussions	1	2	3	4	
22	speaking at seminars, meetings and presentations	1	2	3	4	
23	talking with professionals in real situations	1	2	3	4	
24	speaking with patients, co-workers and fellow students	1	2	3	4	

Reading Skills

With the help of the computer technology, I think I can develop English reading skills in:					
No.	Items	SD	D	A	SA	NA
25	reading articles in professional journals	1	2	3	4	
26	reading medical reports	1	2	3	4	
27	reading medical textbooks	1	2	3	4	
28	reading English magazines and newspapers	1	2	3	4	
29	reading texts on the World Wide Web	1	2	3	4	
30	reading instructions for patient care	1	2	3	4	
31	reading doctor's orders	1	2	3	4	

Writing Skills

With the help of the computer technology, I think I can develop English writing skills in:					
No.	Items	SD	D	A	SA	NA
32	taking lecture notes in class	1	2	3	4	
33	writing nursing notes/ reports in real situations, ex. hospitals and clinics	1	2	3	4	
34	writing term papers for the classes	1	2	3	4	
35	writing articles for publication in medical journals	1	2	3	4	
36	writing medical case reports	1	2	3	4	
37	writing instructions to patients	1	2	3	4	

Vocabulary Skills

In terms of English Vocabulary, with the help of the computer technology, I think I can:					
No.	Items	SD	D	A	SA	NA
38	acquire more common core vocabulary	1	2	3	4	
39	acquire more medical terminologies	1	2	3	4	
40	gain more vocabulary knowledge in terms of meanings, usages, synonyms, antonyms and etc.	1	2	3	4	
41	better use vocabulary in various (including real) settings	1	2	3	4	

Section D: Self-Evaluation of Macro English Proficiency

No.	Items	SD	D	A	SA	NA
42	Overall, I think I have sufficient common core vocabulary.	1	2	3	4	
43	Overall, I think I have sufficient vocabulary for work.	1	2	3	4	
44	Overall, I think I am proficient in English listening.	1	2	3	4	
45	Overall, I think I am proficient in English speaking.	1	2	3	4	
46	Overall, I think I am proficient in English reading.	1	2	3	4	
47	Overall, I think I am proficient in English writing.	1	2	3	4	

ONLINE LEARNING STYLE PREFERENCES: AN ANALYSIS ON TAIWANESE AND USA LEARNERS

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ABSTRACT

With the growing advances in telecommunication techniques, many countries have adopted e-learning into school education and life-long learning. College institutions in Taiwan and many other countries have followed such trend by establishing a wide variety of distance learning course offerings. In these new multicultural teaching and learning environments, learning styles surface as an important variable to take into consideration.This paper reports on the development of an online learning style preferences inventory and the analyses of data collected in two countries, Taiwan and USA. A 64-item online learning styles inventory was distributed to Taiwanese and American students respectively, 368 and 371 valid sets of data were collected and analyzed, and the results showed differing patterns on the online learning style preferences of the sample.The results of this exploratory study will be helpful in at least two ways. First, educators in different countriescan use our findings to hypothesize and further investigate their students' overall online learning style preferences. Second, the results can potentially serve as a basis for the design and implementation of cross-cultural telecommunication exchanges, many of which have been launched for second/foreign language and cross-cultural learning in the past few years.
Keywords: Learning styles, college students, Taiwan students, American students

INTRODUCTION

Rapid advances in telecommunication techniques have inspired many countries to adopt online learning (which is also referred to as e-learning) into school education and life-long learning, thereby offering more diverse and convenient learning options for students. College institutions in Taiwan have followed such trend by establishing a wide variety of distance learning course offerings. However, how suitable are online learning courses to meet the needs of students with diverse learning styles? According to some related studies, learning process is individualistic, which is affected by a person's cognitive ability, physiological state, motivation and emotion, and interaction between the instructional environment and teacher (Keefe, 1987). In other words, we need to value students' individual differences. Before we can teach students according to their background and strengths, we need to identify their different learning styles. Scholars have identified this needs for learners of different levels in their studies as well (Güven&Özbek, 2007; Naimie, Siraj, Abuzaid, &Shagholi, 2010; Özgen&Bindak, 2012). As different learning styles would affect students' learning outcomes, the present study recognized the importance to design an online learning style inventory. Online instructors may use the inventory and its outcomes to design effective e-learning courses for students of diverse online learning style preferences. The present study describes the ways in which we select learning style categories for online learning assessment, the design of items that gauge online learning styles, and the administration of the inventory to Taiwanese and American students. The research questions that guided the present study included: (1) What are the preferences of online learning styles of Taiwanese and American students respectively? and (2) Which online learning styles account for the largest differences in terms of Taiwanese and American students' learning preferences? The results of this exploratory study can potentially assist in the design, implementation, and assessment of future cross-cultural telecommunication exchanges, many of which might be based on projects geared towards second/foreign language and cross-cultural learning in the past few years.

LITERATURE REVIEW
Definition and Categorization of Learning Styles
In the past, school instruction was focused on course designs and teachers' instructional strategies, which was believed to suffice for promoting effective learning. Through time, we have come to an understanding that teaching quality is deeply affected by student's characteristics, the teacher's teaching styles, and teaching environment (Keefe, 1987). A student's characteristics (in terms of learning styles), refer to an individual's combination of stable cognitive, affective, and physiological states, thus the students' preferred behavior would be identified in terms of how they perceive, respond, and interact with the environment (see the definition of learning style in NASSP, from Keefe, 1987). Although "cognitive style" and "learning style" were considered as synonymous terms in the past, a more contemporary interpretation of terms indicates that learning styles not only encompasses cognitive styles, but also affective and physiological learning preferences.

Gregorc (1984) proposed that "style" actually reflects an individual's unique, systematic thoughts and modes of behavior. This is also the behavior model for environmental adjustment, formed from the interaction among an individual's genes, environment, and cultural factors. While "style" is a hypothesized constructive concept, understanding a person's learning style will be helpful to explain the series of learning actions and to further improve learning outcomes. If students are exposed to teaching methods inappropriate for their learning styles, this may result in affective and physiological perceptual problems.

Curry (1983) provided the analogy of the structure of learning styles as to the peeling of onions. There are several levels. First, the core of the onion is an individual's basic "personality trait" and this trait measures how this individual accesses and integrates information. The second level is "information-processing," which focuses on the individual's information-processing and cognitive preferences. The third level is "social interaction," that is, the effect from an individual's interaction between the learning environment and the individual's peers. Finally, the outer level is more focused on individual preferences for instruction and environment. An individual's learning style is stable and difficult to change near the core, while outer levels are prone to be changed with learning or experience.

The Role of Learning Styles in Learning and Teaching
Individuals possessing different learning styles often indicate respective learning styles preferences. However, scholars have pointed out that preferences of different learning styles do not lead to different results in intelligence or academic performance. For examples, Dunn (1990) believed that the nature of the content or subject matter is not the cause of learning failure—if an instructor can teach with the styles the students are good at, any student can learn effectively. Dunn, Griggs, Olson, Beasley and Gorman (1995) collected and analyzed 36 studies which adopted Dunn's learning style assessment tools from 1980 to 1990. Results showed that students exposed to learning environments suitable for their learning styles obtained average test grades and learning attitude scores that were three-fourth standard deviation higher than those obtained by students exposed to unsuitable learning environments. In another study, individuals exposed to learning environments suitable for their learning styles showed improvement in scores in their academic performance (Dunn, 1990). Hence, if teachers understand the types of learning styles students possess, and if they redesign or adjust the teaching methods to provide learning environments appropriate for students' specific learning styles, this may help to improve students' learning outcomes. Therefore, the adequate diagnosis of students' learning styles has the potential to provide useful information for educators wishing to design suitable teaching methods and teaching environments for their students (Keefe, 1987).

Assessment of Learning Styles
Five assessment measures are commonly used for the purpose of learning style assessment: (a) *the Group Embedded Figures Test* (Witkin, 1976); (b) the *Learning Style Inventory* (Dunn, Dunn, & Price, 1981); (c) *Learning Style Profile* (Keefe, 1987); (d) the *Gregorc Style Delineator* (Gregorc, 2004); and (e) *the Index of Learning Styles* (Felder &Spurlin, 2005). According to the available published literature on these measures, the reliability of the learning style inventories reported to date is moderate at best.

One of the precursor measures for the assessment of learning styles is the *Group Embedded Figures Test* developed by Herman Witkin (1976) and his colleagues. Participants who are administered this test are asked to locate a specific shape in a complicated figure in order to identify if the individual is field independent/analytic or field dependent/global when processing information. Another common assessment measure is the *Myers-Briggs Type Indicator* (Myers, 1978), which was developed according to Jung's personality theory, and is used to identify four personality dimensions (extraversion-introversion, sensation-intuition, thinking-feeling, and judging-perceiving). David Kolb (1976) developed a learning style scale based on his experience learning model. The model is a four-step cycle that goes from concrete experience, reflective observation, abstract conceptualize,

and then to active verification. Students' learning preferences are then categorized as divergers, assimilators, convergers, and accommodators.

Dunn's *Learning Style Inventory*(the version for grades 3~12) measures 24 factors (Dunn, Dunn, & Price, 1981), and the *Productivity Environmental Preference Survey* (for adult learners) measures 21 factors (Price, Dunn, & Dunn, 1982). Besides different cognitive or perceptual styles, Dunn et al. believed that individuals may also differ in terms of environment and social interaction preferences. An individual's learning styles may be classified into four main categories: environmental (sound, light, temperature, classroom design), emotion (motivation, persistence, responsibility, need for structure), sociological (working alone, with others, with an adult), and physical/perceptual preference (visual, auditory, tactile, kinesthetic, intake, time of day, need for mobility). Dunn's inventory reported low to moderate reliability coefficients ranging from .55 to .88.

Keefe (1987) and his associates developed a *Learning Style Profile* for grades 6-12 students, measuring 23 factors in total—cognitive skills (analytic, spatial, discrimination, categorizing, sequential processing, memory), perceptual response (visual, auditory, emotive), persistence orientation, verbal-spatial, manipulative, study time (early morning, late morning, afternoon, evening), grouping, posture, mobility, sound, lighting, and temperature. The internal consistency of the subscales of the *Learning Style Profile* ranged from .47 to .76, and the average coefficient was .61. The authors attributed this low average reliability to the small number of items that comprise for some sub-scales (Keefe & Monk, 1986).

Gregorc Style Delineator (Gregorc, 2004) measures cognitive preferences related to perception. It classifies cognitive preferences into two dimensions: Concrete-Abstract, Sequential-Random, resulting in four learning styles: Concrete Sequential, Abstract Sequential, Concrete Random and Abstract Random.

The *Index of Learning Styles* was developed by two scholars, Felder and Soloman, in 1991 (Felder &Spurlin, 2005). It is an online instrument and can be automatically scored on the Web after the answers are submitted. It contains 44 items to assess preferences on four dimensions (active/reflective, sensing/intuitive, visual/verbal, and sequential/global). The Cronbach's α of the *Index of Learning Styles* for the four dimensions ranged from .41 to .76; test-retest correlations (4-week, 7-week, and 8-month) were from .50 through .87 (Felder &Spurlin, 2005).

Features of Online Learning

With advances in information technology, online and blended courses unrestricted by time and space are gaining increasing popularity among instructors and learners. Many teachers have also found learning tools effective, such as the use of Web 2.0 technology. For instance, encouraging reports on the use of Information and Communication Technology support the integration of intentional learning (Oshima, Oshima, Yuasa, Konishi, Itoh, & Okada, 2008), the use of weblogs (Juang, 2008; Wan & Tan, 2011), and the use Wiki for learning purposes (Chua, & Chua, 2008; Twu, 2010). A study by Thadphoothon (2002) indicated that "computer-mediated collaborative learning has the potential to enhance critical thinking in language learning" (p. 1491). Instructors can make good use of discussion boards to foster students' critical thinking given the versatile features of these boards, which allow for the integration of writing skills and asynchronous class interaction. Students can assume the role of moderators and carry out collaborative learning through interactive activities.

The unique features of online learning may be more suitable than traditional course features for some types of learners. For instance, shy, independent learners may find online learning more comfortable than traditional learning in face-to-face environments. In addition, as compared with the traditional, systematic, linear teaching courses, online course design may be more appropriate for students with non-traditional and non-linear learning styles (Illinois Online Network, 2008). Communication in online learning environments relies mostly on students' writing abilities, and draws upon students' self-motivation and discipline (due to unfixed classroom and class time) (Mupingo, Nora, & Yaw, 2006).

Without the direct contact and interaction that traditional classroom instruction offers, online instructors may find it difficult to identify online learners' learning preferences (Graf,Kinshuk, & Liu, 2009), which poses a problem: If learners' learning styles are not known, it would not be possible for teachers to tailor the course design and delivery in order to meet learners' individual learning style preferences.

According to Carnevale (as cited in Mupingo, Nora, & Yaw, 2006), it is difficult to identify the specific learning styles of online students, which might often result from too many dispersed learning styles, or assessment tools adopted inappropriately for e-learning environments. Without a doubt, a learning style assessment tool appropriate for students in online learning environments would assist in the design of suitable online courses for all learners.

As we can see, the learning style inventories described in this section were geared toward learning in the traditional settings. Furthermore, many studies which explored on students' learning styles and online/emerging technologies actually employed or adapted one of these learning style inventories (Graf, Kinshuk, & Liu, 2009; Saeed, Yang, &Sinnappan, 2009). Through the current study, we have developed an inventory of online learning style preferences (the development process was published in earlier papers, for details please see Liu, Shih, &Yeh, 2008; 2010).

Learning Styles in Different Cultures
In terms of learning style preferences studies, researchers have examined secondary English as a Second Language (ESL) students' basic perceptual learning style (visual, auditory, kinesthetic, and tactile) learning preferences across Korean, Mexican, Armenian-American, and Anglo cultures (Park, 1997); Armenian, African, Hispanic, Hmong, Korean, Mexican, and Anglo cultures (Park, 2001); and Mexican-American high school and university students (Schaiper& Flores, 1985). These research studies found that all ethnic groups favor kinesthetic, auditory, and tactile learning. With the exception of the Anglo students, all other students were identified as strong visual learners. This is also supported by Ku and Chang's (2011) study on Taiwanese college students, showing that Taiwanese learners are visual learners than verbal learners. In addition, Armenian, Korean, and Anglo students tended to not prefer cooperative learning. University-level students were much more aware of their own preferences than secondary school students. In another study, Sy (1991) administered Reid's Perceptual Learning Style Preference Questionnaire to 220 freshmen, sophomore, and junior English majors in northern Taiwan. The students in Sy's study reported having two major styles (tactile and kinesthetic) and four minor styles (auditory, visual, group, and individual learning).

Findings from these highlight the need for teachers to identify their students' learning styles and match their own teaching styles to their students' learning styles. The identification of students' learning styles in online environments can be enhanced through use of versatile tools such as multimedia and multi-sensory materials (Park, 2001).

A study by Hsiao (2000), investigated the use of the first language (L1) or the second/foreign language (L2/FL) when adopting Likert-scales to measure L2 strategies. Participants completed the ESL/EFL version of Oxford's Strategy Inventory for Language Learning (SILL). Half of the participants took the L1 (Chinese) version, and the other half took the L2 (English) version. Through statistical analyses, Hsiao found no conclusive evidence on whether one should present questionnaire items in L1 or L2. He concluded (a) the differences found in reliability for L1 and L2 inventories are negligible; (b) for validity, neither method has factors with over 50% of variance explained; and (c) the goodness-of-fit indices indicated neither L1 nor L2 method produced a well fit to the data. This study shows that bilingual versions of an inventory is reliable and can be filled out by respondents of different cultures.

Dr. Geert Hofstede has developed culture theories based on people of different cultures. In his theory, Hofstede's (2001) originally described four cultural dimensions based on his study of international work related values. Later, he expanded his theory to encompass five cultural dimensions in light of findings from studies conducted on 50 different countries. Hofstede's original four dimensions are: power distance, individualism versus collectivism, uncertainty avoidance, masculinity versus femininity, and short-term versus long-term orientation. *Power distance* is defined as the degree to which the inequality between the less powerful people and more powerful people in the society is accepted. In terms of the second cultural dimension, *individualism* is identified as an opposite characteristic to *collectivism*. An individualistic culture emphasizes the independence of the individuals. In contrast, a collectivistic culture indicates that people emphasize human relationship and seek harmony with their fellow countrymen. The third cultural dimension is *uncertainty avoidance* and it defines the degree to which people of a culture can handle unstructured or unpredictable situations. Cultures that are high on the *uncertainty avoidance* dimension are perceived as intolerant of changes. On the other hand, cultures that are rated low on the *uncertainty avoidance* dimension are perceived as relaxed, unemotional, and risk-taking. With regard to the fourth cultural dimension, Hofstede posited that *masculine* societies clearly differentiate between the social roles for men and women. The feminine societies allow overlapping roles for both sexes. Finally, the fifth dimension, *short-term* versus *long-term orientation* contends (as does *Confucian work dynamism)* that Asian cultures tend to be long-term oriented (i.e., the people maintain the Confucian values), while Western cultures tend to be short-term oriented.

Most of the studies in Taiwan relating to online learning focused on local students' learning preferences and academic performance in different disciplines (Shih, 2002). Through search of the literature, we noticed that most of the studieson students' online learning preferences weredone in the single cultural settingwithout involving the comparison of students of different cultures. For example,in the area of Engineering (Chuang,

2010), social sciences (Su, 2007), and mathematics (Wang, 2011).Many cross-cultural connections and teaching were conducted in L2/FL language learning. However, these studies explored the utilization of learning strategies and pre-connection trainings in foreign language learning per se (Takaya, 2009; Takaya & Shih, 2012).In terms of learning strategies, a study by Hsiao (1997) had 165 Taiwanese college students complete the *Strategy Inventory for Language Learning*. Factor analyses and regression analysis on the data yielded six factors: social strategies, compensation-affective strategies, memory strategies, cognitive strategies, formal practice strategies, and functional practice strategies. Results suggested that two of the six factors had predictive power – the compensation-affective and formal practice strategies. The former includes significant predictors such as negative attitudes toward the English class, self-esteem, and motivation. The latter has a significant predictor of attitude toward learning English.

In terms of learning styles and learning with technology, Pi-Ching Chen (2004) conducted a study to identify National Cheng Kung University freshman and sophomore students' preferred learning styles and attitudes toward technology-integrated EFL instruction. Chen developed an instrument of *The Scale of Educational Technology Attitudes* which included 44-item *Index of Learning Styles* and 30-item *Scale of Technology Attitudes*. Independent sample t-tests showed students with active, intuitive, verbal, and global learning styles revealed more positive attitudes toward educational technology use for EFL instruction than those with reflective, sensing, visual, and sequential learning styles.

In terms of research on cross-cultural learning, Shih and Cifuentes (2003) conducted a study with U.S. pre-service teachers and Taiwanese college-level EFL learners. This project engaged U.S. and Taiwanese students in an intercultural exchange through the use of telecommunication whereby students practiced the teaching and learning of the English language. Shih and Cifuentes' study reported cultural issues and phenomena noted by the Taiwanese students. These issues included: the need for visual images, bewilderment, excessive expression of gratitude, disparate expectations, direct vs. indirect writings, and misinterpretation. Their study stressed the importance to acquaint students with cross-cultural communication principles and online communication tips during the planning phase of projects involving cross-cultural telecommunication exchanges.

Table 1 shows the theoretical framework of this study.

Table 1. Theoretical Framework of the Current Study

Areas	Dimensions	Literature
Learning Styles	Perceptual Cognitive Social	Dunn, Dunn, & Price, 1981; Felder &Spurlin, 2005; Gregorc, 2004; Keefe, 1987; Kolb (1976)
Culture	Individualism vs. collectivism; Power distance; Masculinity vs. femininity; Uncertainty avoidance; Long-term vs. short-term orientation	Hofstede (2001)

METHODOLOGY
Selection of Online Learning Style Categories
Unlike traditional face-to-face learning, online learning does not restrict the time or location to access the course. Online learning, however, does require student's self-management of their own learning. Online learning contents allow multiple media features such as audio-visual elements, graphics, textual information, and hyperlink functions. Students' preferred ways of learning when they are dealing with the online setting may differ from the traditional face-to-face setting, i.e., when they access materials in the online Learning Management Systems (LMS) and studying/interacting with online materials. In considering the nature of online learning and the learning style categories present in commonly used learning style tests (for example, those from Dunn, Kolb, Keefe, Gregorc, Felder and Soloman), we identified three categories consisting of a total of 15 factors, which provided the framework for the learning styles inventory in the online settings developed by the present study:

(i) Perceptual types (this refers to the predominant use of a particular perceptual sense in learning): 1. Text: preference for textual information in learning; 2. Visual: preference for figures and charts information; 3. Auditory: preference for sound and voice information; 4. Active: preference for touch, hands-on operation, and self-experience.

(ii) Cognitive processing types (this refers to the cognitive tendency for processing information): 1.

Abstract: preference for abstract or conceptual methods for information processing; 2. Concrete: preference for daily experience or concrete examples; 3. Serial: preference for serial and linear learning; 4. Random: preference for learning in a non-linear sequence or order; 5. Holistic/Global: preference for overall understanding of the information; 6. Analytic: preference for detailed analysis of every component of the reading material or information.

(iii) Personality types (this refers to preferences in social interaction and personal traits in learning condition): 1. Study Alone: preference for solitary in learning; 2. Study with Group: preference for interaction with peers; 3. Guided: preference for guidance or supervision by an instructor; 4. Persistence: the tendency to focus in learning in a lengthy amount of time; 5. Observer: preference for observation rather than active involvement in discussion or interaction with others.

The inventory was developed in both Chinese and English languages simultaneously. The two versions were reviewed by experts specialized in the fields of learning psychology, e-learning, and assessment for clarity of the items prior to the inventory was administered to the participants in this study. Our *Inventory of Online Learning Styles* included 64 items on learning styles preferences and 10 items on learners' personal background. The whole inventory was 8 pages long. Sample items from the Perceptual, Cognitive, and Personality categories included: for the *Perceptual* type, "When learning online, I learn better if the materials are presented through videos or animation" (Visual/Non-Text), and "When learning online, I like to work on hands-on activities such as online puzzle" (Active); for the *Cognitive* type, items included "When searching for information online, I get a deeper understanding if the information is presented through concrete examples or numbers" (Concrete), and "I usually get lost if the web pages contain many hyperlinks on them" (Serial); and finally, items for the *Personality* type included "I learn better when I can discuss learning materials with my classmates" (Study with Group) and "When learning online, I read the posts on the message board but never express my thoughts (if it's not required)" (Observer). The last part of the inventory asks for the personal information and online learning background of the respondents. For example, the age, nationality, the name of the university attended, and the format of the online courses taken.

Subjects
Data from a total of 739 usable surveys were used for analysis. In Taiwan, 368 valid sets of the inventory were completed by students with humanities, science, business, engineering, medicine and agriculture majors from 10 universities in different areas of Taiwan. These college students reported having been learning English over 10 years. In the United States, 371 valid sets of the inventory were collected from the American students in the southern parts of the country. These college students were also majors from different fields such as humanities, science, medicine, and business.

Experts' Evaluation of the Inventory and the Pilot Study
At the onset of this study, we developed a total of 168 items. Items were assessed twice by three scholars in the fields of psychometrics, learning styles, and online learning respectively. After items were modified according to their feedback, the content validity of the scales was therefore assumed. In addition, the first draft of inventory was administered to five undergraduate students from different fields in different universities in Taiwan. Then, from their responses and suggestions, 105 items were selected for the pilot study. Factor analysis was used in the pilot study to allow us to improve and reduce the items in the inventory. When we reduced the items from 105 to 64, the low Cronbach's α for some factors such as "Auditory," "Concrete," "Serial," and "Random" increased. This indicated the reduction of items improved the reliability of internal consistency of our instrument. Test-retest reliability was also conducted. Other development procedures of the inventory are discussed in Liu, Shih, &Yeh (2008; 2010).

Data Analysis
Data including participants' personal information, and responses on online learning style preferences were analyzed using the computer statistics program entitled Statistical Package for the Social Sciences (SPSS),Version 17.0. Because some of the items in our inventory were negatively stated in agreement with the feedback from the expert reviews, the negative items were reversed when we analyzed them. Rating as "1" was reversed to rating as "5," "2" to "4," "4" to "2," and "5" to "1."

Descriptive statistics (frequencies, means, percentages, and standard deviations) portrayed a profile of the characteristics of the participants and their responses on the learning style preferences and the type of Internet-assisted learning method. Furthermore,Multivariate Analysis of Variance (MANOVA)was used to gauge any statistical significance in the analysis of data obtained from the Taiwanese and USA students on the 15 factors assessed by the inventory. In addition, a discriminant analysis was also applied to distinguish any predominant factors surfacing in either group of students. The absolute value of the standardized discriminant function

coefficient was greater than .30. Lastly, Two-way repeated measures ANOVAs were applied to the two groups of students, the four perceptual learning styles (Visual/Text, Visual/Non-Text, Auditory, and Active), and some other pairs of learning styles, Abstract vs. Concrete, Serial vs. Random, Holistic vs. Analytic, and Study Alone vs. Study with Group. When an interaction effect was found, further repeated measures ANOVA and paired *t-test* were run on the data of each country separately for further analysis.

RESULTS AND DISCUSSION

Three hundred and sixty eight valid inventories from the Taiwanese participants and 371 valid inventories from the American participants were collected respectively. The Cronbach's α coefficients of these two result sets were .76 and .79. Since alpha coefficients of above .80 are considered high (Anastasi&Urbina, 1997), and the coefficients we obtained were slightly lower than .80, this study's alphas were considered moderately high.

A MANOVA was conducted to identify the differences between the Taiwanese and USA students (nationality) in terms of the 15 factors. Results were significant for nationality, with a Wilk's Lambda = .623, $F(15, 608)= 24.49$, $p=.000$, $Eta^2= .377$. Several learning styles were statistically significant: Text, Visual, Auditory, Active, Abstract, Concrete, Random, Holistic, Analytic, Study Alone, Study with Group, and Persistence. Three factors were non-statistically significant: Serial, Guided, and Observer (see Table 2).

Table 2.Results of Differences between Taiwanese and USA students in the 15 learning styles

Factors of Learning Style	Mean Taiwan (N=368)	USA (N=371)	SS	df	F	p.
Text	3.22	3.59	21.51	1	55.68[***]	.000
Visual	3.77	3.47	12.62	1	36.61[***]	.000
Auditory	3.72	3.52	6.19	1	17.25[***]	.000
Active	3.69	3.84	3.41	1	8.02[**]	.005
Abstract	3.29	3.40	2.20	1	4.92[*]	.027
Concrete	3.94	3.82	1.46	1	4.56[*]	.033
Serial/Linear	3.53	3.51	.003	1	.01	.911
Random	3.36	3.23	3.86	1	10.76[**]	.001
Holistic/Global	3.47	3.33	4.43	1	14.82[***]	.000
Analytic	3.22	3.50	11.87	1	45.85[***]	.000
Study Alone	3.26	3.64	23.85	1	36.81[***]	.000
Study with Group	3.47	3.31	5.51	1	10.84[**]	.001
Guided	3.41	3.30	1.30	1	3.07	.080
Persistence	2.94	2.47	33.49	1	118.42[***]	.000
Observer	3.09	3.14	1.11	1	3.21	.074

[*] $p <.05$ [**] $p <.01$, [***] $p <.001$

With regard to the discriminant analysis performed, the standardized discriminant function coefficients obtained indicated that the factors that can best distinguish the learning style preferences of both countries are Persistence, Analytic, Text, Study Alone, and Visual (coefficient is greater than .30) (see Table 3).

Table 3.Discriminant Analysis on the online learning style preferences by nationality

Predictor	Standardized Function Coefficient
Text	-.314
Visual	.255
Auditory	.156
Active	-.331
Abstract	.183
Concrete	.179
Serial/Linear	.032
Random	.173
Holistic/Global	.301
Analytic	-.546
Study Alone	-.204
Study with Group	-.026
Guided	.073
Persistence	.653
Observer	-.068

A two-way repeated measures ANOVA was conducted using the variables nationality and perceptual styles (a 2x2 factorial design) to identify any differences in terms of learning styles (text, visual, auditory, and active) between the two countries. Since Mauchly'ssphericity assumptions were violated, adjustments were made to the ANOVA results by using the Geisser-Greenhouse epsilon. We were interested in looking at the interaction effect. The result revealed a statistical significant interaction effect, F (2.739, 1873.327)= 47.55, p= .000 (see Figure 1).
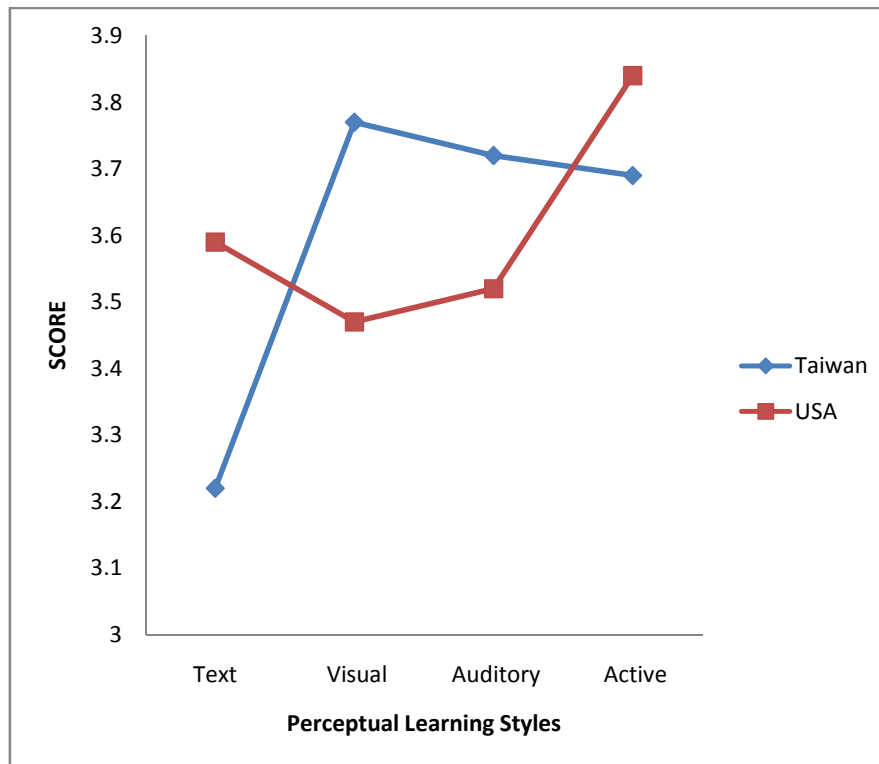
Figure 1. The Interaction Effect of the Perceptual Learning Styles of Taiwanese and American Students.

When a one-way repeated measures ANOVA was run on the Taiwanese and the USA data respectively, for the Taiwanese data, results revealed a statistical significant effect, F(2.765, 970.487)= 87.10, p= .000. Post hoc analyses using Bonferroni showed a difference between text learning style and the other three styles (visual, auditory, and active). There was no statistical difference among these three learning styles, however. Results suggested that Taiwanese students had a lower preference of particularly the text learning style (M= 3.22, SD=.56). As for the USA data, results revealed a statistical significant effect, F(2.708, 901.715)= 21.42, p= .000. Post hoc Bonferroni analyses indicated this statistical significant difference existed between active learning style and all other three styles, but there was no difference among text, visual, and auditory learning styles. The American students in this study tended to employ more of active learning style than the other perceptual styles (M=3.84, SD=.70).

Two-way repeated measures ANOVAs were applied to the pairs of learning styles: Abstract and Concrete, Linear and Random, Holistic and Analytic, and Study Alone and Study with Group. Results yielded a statistical significance on the interaction effect of Abstract and Concrete (F(1, 721)= 14.73, p= .000), Holistic and Analytic (F(1, 712)= 85.18, p= .000), and Study Alone and Study with Group (F(1, 726)= 31.82, p= .000). In other words, only the pair of Linear and Random learning styles did not have a statistical significant interaction effect, which means there were no differences country-wise.

Lastly, paired *t-test* were calculated on pairs of learning styles with statistical significant interaction effects within the data sets for each country. For the Taiwanese data, the statistical significant learning styles included: Abstract vs. Concrete (t(361)=-15.73, p<000), with a higher mean score on Concrete; Holistic vs. Analytic (t(359)=7.82, p<000), with a higher mean score on Holistic; and Study Alone vs. Study with Group (t(362)=-3.47, p=001), with a higher mean score on Study with Group (see Table 4). We can note from the obtained outcomes that Taiwanese learners preferred learning with concrete materials, had a holistic learning style, and preferred learning with a group instead of by themselves.

Table 4. Results of online learning styles of Taiwanese students

	1st Mean	2nd Mean	Paired Differences		t	df	p
			Mean (1st-2nd)	SD			
Abstract vs. Concrete	3.29	3.94	-.65	.79	-15.73[***]	361	.000
Holistic vs. Analytic	3.47	3.22	.25	.60	7.82[***]	359	.000
Alone vs. Group	3.26	3.47	-.20	1.12	-3.47[**]	362	.001

Note. 1st Mean stands for the mean score of the first factor on each pair of factors. Similarly, 2nd Mean stands for the mean score of the second factor of the pair.

˙˙*p* <.01, ˙˙˙*p* <.001

Regarding the data from the United States, the statistical significant cognitive learning styles includes: Abstract vs. Concrete (t(360)=-9.74, p<000), with a higher mean score on Concrete; Holistic vs. Analytic (t(353)=-5.24, p<000), with a higher mean score on Analytic; and Study Alone vs. Study with Group (t(364)=4.45, p<000), with a higher mean score on Study Alone (see Table5). The USA students preferred learning through concrete materials, they were more analytical, and tended to study alone.

Table5. Results of online learning styles of USA students

	1st Mean	2nd Mean	Paired Differences		t	df	p
			Mean (1st-2nd)	SD			
Abstract vs. Concrete	3.40	3.82	-.42	.83	-9.74[***]	360	.000
Holistic vs. Analytic	3.33	3.50	-.17	.60	-5.24[***]	353	.000
Alone vs. Group	3.64	3.31	.33	1.43	4.45[***]	364	.000

Note. 1st Mean stands for the mean score of the first factor on each pair of factors. Similarly, 2nd Mean stands for the mean score of the second factor of the pair.

˙˙˙*p* <.001

Table 6 shows a summary table listing the online learning style preferences of Taiwanese and USA students. The results are summarized from the mean of the learning styles results from the inventories of both countries and the statistical analyses illustrated in the previous paragraphs. The "Observer" learning style is not included in the table because the mean outcome was only slightly over 3.0 and the MANOVA results showed no statistical significant differences in the two groups. It should be noted that this outcome does not mean that students of these two countries have no preference in terms of the styles not identified in the table. The results simply show the degree of preference in terms of certain learning styles. Our results do not indicate that, for instance, the Taiwanese students do not adopt Text learning style at all, nor do results conclude that the American students do not learn through visual or audio materials.

Table6. Results of Comparison of Online Learning Style Preferences of Taiwanese and US students

Taiwan	USA
Perceptual Type	
Visual	Active
Auditory	
Active	
Cognitive Type	
Concrete	Concrete
Serial	Serial
Holistic	Analytic
Personality Type	
Study with Group	Study Alone
Guided	Guided

According to the results obtained by the present study, when compared to American students (who prefer more active learning), Taiwanese students preferred to learn through Visual, Auditory, and Active learning styles. Park (1997; 2001) and Schaiper& Flores (1985) found that except the Anglo students, students of other cultures appeared to be predominantly visual learners. Shih (2009) also found similar results. She administered the *Inventory of Online Learning Styles* to 101 Taiwanese humanities students and concluded that students' least

preferred style was to learn through reading (the Visual/Text learning style) compared to Visual/Non-Text, Auditory, and Active styles. The outcome from the Taiwanese data set in the current study again obtained a similar finding, and based on results from the discriminant analysis conducted, both the Visual/Text and Visual/Non-Text learning styles are among the ones that could assist best in distinguishing between the two cultures. This finding may pose a concern for instructors of online courses because reading is an important skill for learning in general and for the learning of foreign languages. In addition, the cyber world and broadcast video used in online learning environments are full of visual components. Taiwanese youngsters have open access to the Internet and 24-hour cable TV. As of February 2010, around 16,200,000 people have been accessing the World Wide Web. Especially the number of people above 12 years old who have accessed the Internet are up to 14,669,915 people, which represents 72.56% of this population (Taiwan Network Information Center, 2010), and this might have influenced people's ways of learning. Along with the rise in the number of individuals accessing the Internet, a growing interest in improving the reading skills of Taiwanese students has surfaced. The Ministry of Education in Taiwan has stressed the importance of reading education since year 2000 when the former Minister of Education, Dr. Ovid J. L. Tseng, started to urge and promote extensive reading instruction for children.

The current study suggested that in terms of cognitive processing, both the Taiwanese and American students had no differences in their preference of the learning styles of Serial vs. Random. MANOVA results showed no significant difference in their serial learning style, but the Taiwanese students do lean more towards Random learning style when compared with the Americans on the Random learning style (Taiwan M=3.36, SD=.57; USA M= 3.23, SD=.61). Both groups appeared to prefer learning through the use of concrete materials. In Kim and Bonk's (2002) study, a cross-culture asynchronous web-based conference project was implemented where American students were less concerned with theories and more interested in practice regarding the topic of discussion. The present study suggests that Taiwanese students appeared to like learning holistically (by looking at the overall picture) rather than analytically (by focusing on the details of every part) compared to USA learners. This finding is not consistent with a previous study's by Rao (2001), which concluded that East Asian learners tended to be analytical and field-independent. The inconsistency between the present study and Rao's findings may be due to the pervasive use of learning via the Internet, which may now be influencing the ways in which people learn. Taiwanese students often times search for information on the WWW and seek a quick overview of information from the websites. American students, on the other hand, tend to focus more on details in the information offered on the websites or online coursework.

Results obtained from analyses of several of the items in our instrument are consistent with Hofstede's theory. For instance, Taiwanese students appeared to prefer group learning (Study with Group), while USA students preferred individualistic learning (Study Alone). This finding is in line with Hofstede's theory that the Taiwanese culture rates "low" on individualism, while the USA culture rates "high" the Individualism scale (Hofstede, 1986). The non-statistically significant results obtained on the Guided learning style were unexpected in light of Lee's (2004) finding that Asian students tend to prefer teacher-centered environments that provide ample guidance in the learning process. We hypothesize that the lack of consistency between our findings and Lee's may be due to the increasing use of the Internet and the growing promotion of online learning at the university level by the Ministry of Education in Taiwan, which may have prompted changes in the roles of the teacher and students. Taiwanese students have been identified as rating higher on Persistence compared to American students, and Hofstede (2001) indicated that Asian cultures are long-term oriented, which also means they are persistent. However, results of the present study revealed that both groups of students yielded a mean score lower than 3.0 on Persistence (Taiwan M= 2.94, SD=.40; USA M= 2.47, SD=.66). This finding suggests that online instructors could, for example, offer online lectures featured on various shorter video clips instead of using one single and long video clip. Lastly, our study indicated that students of both countries had no differences in terms of their roles of observers in cyber environments. Both groups obtained a mean score of around 3.0 on this Observer factor. Scholars have noted that many students may lurk in online chats, but shy learners may also turn out to be "talkative" and active in online situations. An online mode of interaction allows learners to input information at their own leisure and from an unspecified location; as a result, the frequency of interactivity increases. Kroonenberg (1994/95) found that shy learners interacted more frequently online than in face-to-face modes, and Montgomerie and Harapnuik (1997) found that students became more open in discussions and reflected their thoughts in depth while taking an online course.

The present study employed the *Inventory of Online Learning Styles* which consists of 15 factors (in three large categories) related to online learning situations. The inventory can assist instructors or online course designers in gathering data that can shed light on online students' preferred learning styles within three dimensions (perceptual, cognitive, and personality). The information derived from these data can then serve as a basis for the design of courses that meet students' needs and the adoption of appropriate teaching methods. Although the

outcomes of the present study are indicative of learning styles preferences of participating Taiwanese and USA students, instructors could use inventory outcomes of particular groups of learners within a single online learning environment in order to design materials geared towards meeting students' individual needs. Oftentimes, students coming from multiple cultural backgrounds participate in one single online course. In this case, if students prefer to learn through auditory materials, the online course could include audio files with teachers' lectures and guest speakers' talks; for learners who prefer active learning, instructors could offer more materials such as 3D animations and/or online puzzles; for students who like to study with peers, teachers could increase the opportunities for synchronous discussion (e.g, via MSN Messenger or JoinNet videoconference programs); for holistic learners, clear objectives, overviews of online course contents, and benefits of online coursework could be outlined clearly; and for the learners who need to be monitored constantly in their learning processes, course designers could include checklists and assessments as means of guidance. In addition to meeting the needs of online learners, results from the administration of our inventory can be compared with students' learning performance scores in order to improve the design of online courses.

CONCLUSION

This paper reported on the results obtained from the administration of an inventory designed to assess online learning style preferences. It was found that the Taiwanese students and USA students participating in this study showed different patterns of preferences in their online learning styles. The researchers of this study currently continue to analyze data in order to further validate the inventory. It is expected that the inventory will encourage instructors to explore the perceptual, cognitive, and personality styles of their students so as to design suitable online instruction. In addition, the results from the inventory can also assist participants of cross-cultural telecommunication exchanges, some of which have been launched internationally for second/foreign language and cross-cultural learning.

The limitation of this study is that even though there were over 350 valid sets of the inventory collected from the United States, the majority were from college students in the southern part of the country. Future studies should collect samples from other parts of USA. It could also go beyond the college learners of the countries of Taiwan and USA, for instance, data can be collected on British students, African students, or Australian students. Learners at the levels other than the college-level could also be a target, as suggested by Bozkaya, Aydin, and Kumtepe (2012). Furthermore, the exploration of other additional factors such as environmental and emotional factors related to students' online learning would also offer additional insights to practitioners of online teaching.

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ONLINE SOCIAL NETWORKING-BASED HEALTH EDUCATION: EFFECTS ON STUDENTS' AWARENESS AND PRACTICE OF LABORATORY SAFETY

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ABSTRACT
This study examined the effects of integrating instructional materials in Facebook on students' awareness and practice of laboratory safety. A quasi-experimental pretest-posttest two-group design was used in the study. The results indicate: 1.) The exposure to (Online Social Networking-Based Health Education) OSNBHE can improve students' awareness of laboratory safety (ALS) ($p < 0.05$); 2.) The exposure to OSNBHE can improve practice of laboratory safety (PLS) ($p < 0.05$); and, 3.) The ALS does not predict PLS ($R^2 = 0.09$, $CI = 95\%$).
Keywords: Online social networking; Health education; Awareness of laboratory safety; Practice of laboratory safety

INTRODUCTION
The school laboratories are essential venue for learning. However, these laboratories are endowed with hazards which can lead to the occurrence of accidents and jeopardize the safety of all its users, especially the students (IUPAC, 1992; Weigmann & Shappell, 2002). The incidence of accidents in the school laboratories has increased in the previous years. In The Charlotte Observer article, "Mishaps in School Labs Reveal Lack of Safety", Tammy Webber (2002) of the Associated Press (AP) reported the following: "…. at least 150 students have been seriously injured in school lab accidents in the past four years in the United States; and…. in Iowa, there were 674 accidents in the three school years from fall 1990 through spring 1993, but more than 1,000 in the following three years".

In the Philippines, the Biochemistry laboratory of the 100-year-old Institute of Chemistry Building at the Pavilion 2 of Palma Hall at the University of the Philippines in Diliman, Quezon City, was burnt down last 2010 (Botial, 2010). In addition, a mixture of chemicals released toxic fumes in the science laboratory of San Isidro High School in Makati City on November 27, 2006. Following the incidence, 10 teachers and staff were sent to the hospital after bouts of vomiting and skin rashes. Classes were also suspended and nearby residents were evacuated (National Research Council of the National Academies, 2011). Furthermore, on February 16, 2006, a mercury spill incidence occurred in the science laboratory of St. Andrew School in Paranaque City. Ten students were admitted to the Philippine General Hospital for reported symptoms of mercury exposure. Local and national public health officials closed the school to prevent the further spread of mercury and poisoning of more students (United States Environmental Protection Agency, 2008).

The increasing prevalence of accidents involving students in the science laboratory calls for efficient measures to eradicate, or if not, lessen accident occurrences. One of these measures is the development of awareness and practice of laboratory safety. Harvard University (2012) emphasized, "….awareness is the most fundamental rule of safety". Thus, the provision of information on the awareness and practice of laboratory safety among students is seen as a primordial step in the attainment and maintenance of an accident-free laboratory (Dyer & Andreasen, 1999; Georgia State University, 2008; Harvard University, 2012, Penker & Elston, 2003; Zhao, Li, & Wen, 2007).

Safety promotion, through health education, among adolescent students can be done in various teaching and learning approaches (Dyer & Andreasen, 1999; Redden, 1987; Syrek, 2011; Towner, 1995). However, studies have found out that more students are supplementing or replacing lectures, seminars, and course materials with educational resources that they can access via the World Wide Web or the Internet (Katz, 2008; Liu, 2010). Hence, contemporary learners are said to belong in a "Net-centric" (Baird & Fisher, 2006), "Digital Natives" (Prensky, 2001) and "Web 2.0" (Liu, 2010) generation.

Lenhart (2009) reported that 93% of teens use the Internet in the United States. In the Philippines, social networking is the single most popular online activity among Filipino Internet users, with about nine in ten (89%) have ever used online social networking sites like Facebook or Friendster (Labucay, 2011, p.12). In addition to its social utility, various studies have documented the positive effects of online social networking on learning outcomes such as improvement on interpersonal skills (Yu, Tian, Vogel & Kwok, 2010), acquisition of

knowledge on medicine (Weicha, Cheti, Pollard & Shaw, 2006) and development of self-regulation which includes motivational factors in learning (Mario, 2009).

With its prominence among the youth (Labucay, 2011; Lenhart 2009; Liu, 2010) and its potential as an alternative learning resource as posited by various studies (Koishi, 2004; Liu, 2010; McLoughlin & Lee, 2007; Yu et al., 2010), online social networking is a potential tool on the promotion of awareness and practice of laboratory safety and may subsequently serve as an efficient medium of teaching and learning on the creation and maintenance of an accident-free school laboratory.

The undertaking of this research significantly contributed to the areas of theory, research, practice and policy. In theory, this study affirmed Alfred Bandura's Social Learning Theory (1977) whereby social activities, such as online social networking, are posited as media for the expression of a learner's self-directed active engagement function- an impetus for achieving learning outcomes (viz., awareness and practice of laboratory safety). In research, this study essentially magnified the effectiveness and limitations of online social networking as an alternative and supplementary medium of instruction on developing students' awareness and practice of laboratory safety. In practice, this study provided relevant data for academicians and other stakeholders on the significance and methodology of incorporating online social networking into the pedagogy of safety education among adolescent learners. Lastly, in policy, this study served as reference and impetus among policy-makers, legislators and the like to further spearhead efficient and sustainable policies on the development and improvement of Information and Communication Technology (ICT) in the field of safety education locally and internationally.

THEORETICAL FRAMEWORK

The potential of online social networking in the provision of an alternative pedagogical milieu can be explicated by the social learning theory. According to Bandura's social learning theory (1977), individuals' self-directed active engagement functions as an initial motive for achieving desirable learning outcomes. In the online social networking sites, individuals are equipped with an extraordinary capacity to express themselves, establish various relationships, and interact with others at any distance in time and space, addressing their self expressive, networking and informational needs. To activate such learning and fulfill these needs, online social networking engagement is required (i.e., devoting time and psychological energy to these sites). Individuals can present themselves in an online viewable profile and articulate their social networks. Also, they can establish and maintain extensive relationships with peers and selectively develop further interactions. Those advanced social networking applications greatly expand the number of individuals' learning objects (i.e., connected friends) and their information seeking scope. They can mimic the targeted models/peers by viewing the profiles and exploring the hobbies, interests, or specific knowledge of others, as well as learn a particular topic of interest (i.e., academic subjects) by joining a network or group page and thus finding the information of the topic. Second, it is the individuals' interactions with peers and the situated environment that actually achieve learning outcomes (Bandura, ibid.), functioning as carriers of their initial learning engagement to desirable outcomes. These interactions have been characterized as social acceptance and acculturation in the socialization literature (Bauer, Bodner, Erdogan, Truxillo, & Tucker, 2007; Morrison, 1993; Morrison, 2002). In addition to the direct effect of online social networking engagement on learning outcomes, social acceptance and acculturation, as being important socialization processes, can transform individual online social networking behavior into learning outcomes (Yu, Tian, Vogel & Kwok, 2010).

CONCEPTUAL FRAMEWORK
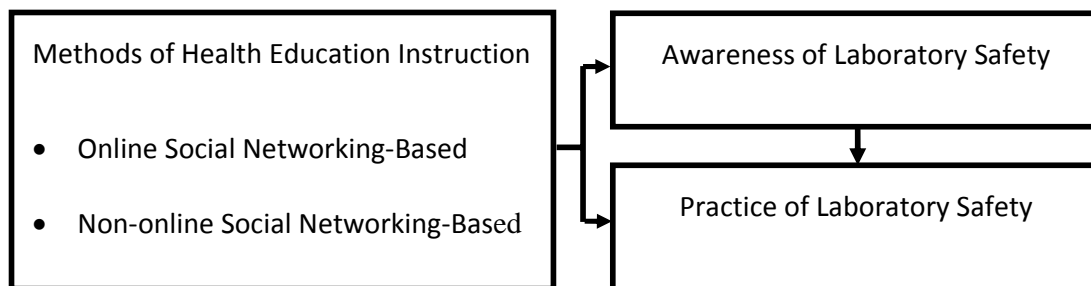
The framework shows the relationship of the two methods of instruction for health education to the awareness and practice of laboratory safety. The independent variable of the study is the method of instruction. The dependent variables of the study are the awareness and the practice of laboratory safety. An arrow connects the two constructs to show the relationship between the awareness and practice of laboratory safety.

An arrow connecting the methods of health education instruction and the constructs (viz., awareness and practice of laboratory safety) is shown to emphasize the significance of the different methods of instruction in the promotion of awareness and practice of laboratory safety among students. The conventional method in the promotion of safety is lecture-seminar. Internet-based learning resources have been posited to have a positive influence on the improvement of learning outcomes (Mario, 2009; Yu et al., 2010; Weicha et at., 2006). The learning outcomes are cognitive (i.e., awareness of laboratory safety) and skill-based (i.e., practice of laboratory safety) (Kraiger, Ford & Salas, 1993; Schmidt & Ford, 2003).The two constructs represent the two goals of the chemistry laboratory safety program -- raising awareness and encouraging enthusiasm for safe practice among laboratory users (Becker, 1987; Dyer & Andreasen, 1999). Furthermore, an arrow connecting the constructs is illustrated to present the possible relationship of the awareness and practice in the promotion of safety in the laboratory. According to Becker (ibid.) and Dyer and Andreasen (ibid.), an awareness of the need to operate safely in the laboratory is required before knowledge is put to effective use.

RESEARCH HYPOTHESES

The research hypotheses of the study are the following:
1. The ALST posttest scores of the students exposed to OSNBHE are significantly higher than of those who were not.
2. The PLST posttest scores of the students exposed to OSNBHE are significantly higher than of those who were not.
3. Awareness of laboratory safety is a significant and positive predictor of laboratory safety.

METHODOLOGY
The Sample
The sample consisted of 16 college students, 6 males and 10 females, with the mean age of 18 years. They were enrolled in a chemistry laboratory course in a private college in Pasay City, Metro Manila, The Philippines, in the 1st semester of Academic Year 2012-2013. They were randomly assigned to either OSNBHE or NOSNBHE group. There were 10 students in the OSNBHE group, 4 males and 6 females. The NOSNBHE group had 6 students, 2 males and 4 females. The number of respondents cannot assume a normal distribution (i.e., mean scores of each student cannot be representative to that of the general population's) thus non parametric statistics (Wilcoxon signed rank and sum rank tests) was used in the study. Ranks of the scores of each student were given more significance in the analysis of data.

Research Design
The study utilized a quasi-experimental pretest-posttest two-group design to determine the effects of OSNBHE on students' awareness and practice of laboratory safety. Visually, the design is as follows:

EG:	**A**	**P**	**X**	**A'**	**P'**
CG:	**A**	**P**	**-X**	**A'**	**P'**

Where;
EG: experimental group
CG: control group
A: Awareness of Laboratory Safety pretest for the experimental and control groups
P: Practice of Laboratory Safety pretest for the experimental and control groups
X: exposure to Online Social Networking-Based Health Education (OSNBHE)
-X: exposure to Non-online Social Networking-Based Health Education (NOSNBHE)
A':   Awareness of Laboratory Safety posttest for the experimental and control groups
P':   Practice of Laboratory Safety posttest for the experimental and control groups

The Instruments
The instruments used in the study were the Awareness of Laboratory Safety Test (ALST) and the Practice of Laboratory Safety Test (PLST). Prior to their use in the study, the content and construct of the instruments were validated by a group of experts in the field of chemistry laboratory safety which was composed of a licensed chemist, MS Chemistry student and chemistry instructor; a Food Safety and Sanitation laboratory instructor and MS Food Science graduate; and, a Department of Chemistry and Life Sciences chairperson and chemistry

professor. The ALST was print-tested to college students in a different university, who were also enrolled in a chemistry laboratory course, for item analysis, done one week prior to the actual administration of tests to both groups. The coefficient of reliability was recorded at $\alpha = 0.80$ which suggests a satisfactory internal consistency and reliability (i.e., the chance that the ALST is measuring the awareness of laboratory safety of students in chemistry is 80%)(George, 2000).

- **Awareness of Laboratory Safety Test (ALST)**

This is a researcher-developed checklist on the components of a laboratory design and their safety conditions and safe practices in the laboratory. This was utilized to assess the awareness of the students on the actual presence of physical hazards in their chemistry laboratory and their awareness on the ideal and safe practices during the conduct of experimentation. This consisted of 20 items on the awareness of safe laboratory conditions and 15 items on the awareness of safe laboratory acts -- both of which are answerable by yes or no.

- **Practice of Laboratory Safety Test (PLST)**

This is a researcher-developed checklist on fundamental safe laboratory practices. This was used by the licensed chemist, the chemistry laboratory instructor of the respondents and the researcher, to evaluate the actual performance of safe laboratory practices of students during their conduct of laboratory experimentations. This is composed of 15 questions on the fundamental safe laboratory practices which are answerable by yes, no or N/A (not applicable).

Data Collection Procedure

The duration of the data collection procedure lasted for two weeks for both OSNBHE and NOSNBHE groups, from the administration of the pretests to the posttests of the ALST and PLST. The ALST and PLST pretests were administered on the first and second days of data collection for the OSNBHE and NOSNBHE groups, respectively. A licensed chemist also used the ALST to evaluate the presence of physical hazards in the laboratory anytime between the administration of ALST pretest and posttest. The answers of the chemist in the ALST served as the standard to which the answers of the OSNBHE and NOSNBHE respondents in the ALST pretest and posttest were compared with for correctness. Furthermore, the OSNBHE respondents provided their Facebook account names on the ALST pretest.

In the PLST, the respondents of both groups were evaluated by the licensed chemist, the chemistry laboratory instructor of the respondents and the researcher on their actual performance of safe laboratory practices during the conduct of three chemistry laboratory experimentations (viz., Solubility, Acids and Bases, and Metals and Acids). The three experiments (i.e., one in the pretest and two in the posttests) that were performed were similar in both groups. The respective scores of each respondent on the PLST as graded by the three evaluators were averaged.

Once the two groups' scores were found comparable in the ALST and PLST pretests, the teaching methodologies were implemented to both groups. The OSNBHE respondents were invited to visit the researcher-made Facebook group page account entitled, "Awareness and Practice of Laboratory Safety", where discussions (thread), photos and videos on the awareness and practice of laboratory safety were incorporated/ uploaded in. The respondents were given a 48-hour period to accept the invitation to be officially part of the OSNBHE group. Furthermore, they were instructed to like the discussions, photos or videos after viewing any of these in order for the researcher to monitor their access to and use of the instructional materials. On the other hand, the NOSNBHE group was facilitated with a lecture-seminar on the promotion of awareness and practice of laboratory safety. The contents and presentation of the lessons in the lecture-seminar were similar to those on the Facebook group page for the OSNBHE group. To control teacher factor, the researcher facilitated both the lecture-seminar for the NOSNBHE group and video presentations and discussions in the group page for the OSNBHE group. Furthermore, the duration of the lecture-seminar was also similar to the duration of the video uploaded in the group page.

The PLST posttests were administered twice during the conduct of two laboratory experimentations of the respondents one week after the implementation of the teaching methods (viz., lecture-seminar for NOSNBHE group and visit to the Facebook group page account for the OSNBHE group) to evaluate the retention and application of the knowledge on the awareness and practice of laboratory safety of the students in each group. The ALST posttest, on the other hand, was administered on the second week of data collection after the two posttests of PLST had been administered to both groups. For the OSNBHE group, the survey-checklist on the OSNBHE was administered after the administration of the ALST posttest.
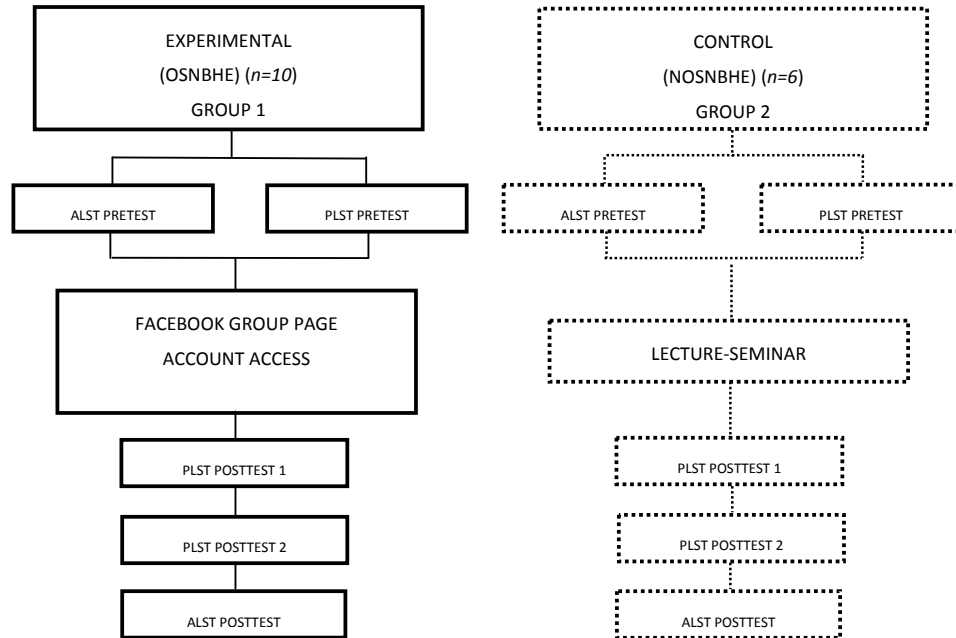
Figure 3. Flowchart of the data collection procedure of the study.

RESULTS
Awareness of Laboratory Safety
Table 1 enumerates the posttest scores of the OSNBHE and NOSNBHE groups in the ALST. A directional Wilcoxon rank sum test for the ALST posttest scores of the two groups concludes that the ALST posttest scores of the OSNBHE are not higher than the scores of the NOSNBHE group in the ALST posttest ($p = 0.0559$).

Table 1. Wilcoxon rank sum test for the ALST posttest scores of the OSNBHE and NOSNBHE groups.

NOSNBHE			OSNBHE		
Student	ALST posttest score (%)	Rank	Student	ALST posttest score (%)	Rank
A_1	89	9.5	B_1	94	15
A_2	71	2	B_2	94	15
			B_3	89	9.5
A_3	83	6	B_4	91	12.5
			B_5	94	15
A_5	89	9.5	B_6	74	3
			B_7	91	12.5
A_5	80	4.5	B_8	66	1
			B_9	89	9.5
A_6	80	4.5	B_{10}	86	7

To evaluate if there is a significant difference between the pretest and posttest scores of the OSNBHE group in the ALST, a nondirectional Wilcoxon signed rank test was performed on the said two scores. The result suggests that there is a significant difference between the two tests ($p < 0.05$). Hence, the exposure to OSNBHE can be inferred to have positively influenced the level of awareness of laboratory safety of the respondents in the experimental group. However, since the ALST posttest scores of the OSNBHE group are not higher than the ALST posttest scores of the NOSNBHE group and no significant difference is noted between the ALST posttest

scores of the two groups ($p = 0.1118$), it can be deduced from the study that both the exposure to the lecture-seminar of the NOSNBHE group and the visit to the Awareness and Practice of Laboratory Safety Facebook group page of the OSNBHE group were effective in increasing the level of awareness of laboratory safety.

Practice of Laboratory Safety

Table 2 shows the mean scores of the OSNBHE and NOSNBHE groups in the two PLST posttests. A directional Wilcoxon rank sum test for the PLST posttest scores of each respondent in the two groups indicates that the PLST posttest scores of the OSNBHE group are higher than the PLST posttest scores of the respondents in the NOSNBHE group ($p < 0.05$). Hence, it can be deduced from the result that the students exposed to OSNBHE performed laboratory experimentations more safely than the students exposed to NOSNBHE.

Table 2. Wilcoxon rank sum test for the PLST posttest scores of the OSNBHE and NOSNBHE groups.

NOSNBHE			OSNBHE		
Student	PLST posttest score (%)	Rank	Student	PLST posttest score (%)	Rank
A_1	60	5.5	B_1	71	8.5
A_2	60	5.5	B_2	71	8.5
			B_3	73	11
A_3	40	1	B_4	72	10
			B_5	83	16
A_4	59	4	B_6	69	7
			B_7	74	12
A_5	46	2.5	B_8	76	13.5
			B_9	82	15
A_6	46	2.5	B_{10}	76	13.5

Table 3. PLST pretest and posttest scores of the OSNBHE group.

Student	PLST pretest score (%)	Mean PLST posttest score (%)	D= post-pre	I D I	Sign of D	R
B_1	65	71	6	6	+	3
B_2	62	71	9	9	+	4.5
B_3	64	73	9	9	+	4.5
B_4	58	72	14	14	+	6
B_5	81	83	2	2	+	1
B_6	66	69	3	3	+	2
B_7	58	74	16	16	+	7.5
B_8	60	76	16	16	+	7.5
B_9	64	82	18	18	+	9
B_{10}	53	76	23	23	+	10

A directional Wilcoxon signed rank test result indicates that there is a significant difference between the pretest and posttest scores of the OSNBHE in the PLST ($p < 0.05$). Thus, the experimental group improved significantly in their performance of safe laboratory practices on two laboratory experimentations after their exposure to OSNBHE. Furthermore, it can be inferred from the findings that the incorporation of instructional materials (e.g., discussions, photos and videos) in the Facebook group page can positively influence and is more

effective in promoting practice of safe laboratory practices among students as compared to the conventional method of lecture-seminar.

Through the utilization of nondirectional Wilcoxon signed rank test, it was found that there is a difference between the PLST mean pretest scores and mean posttest scores of the respondents in the NOSNBHE group ($p < 0.05$). The difference, however, is not positively significant since the PLST mean posttest scores are lower than the PLST mean pretest scores. Thus, it can be inferred from the findings that the lecture-seminar did not promote practice of laboratory safety.

Awareness and Practice of Laboratory Safety
The study further investigated if the awareness of laboratory safety (ALS) influences and predicts practice of laboratory safety (PLS). Since the OSNBHE and NOSNBHE groups' ALST posttest scores are comparable, both were included in the analysis. The posttest scores in the ALST of both groups were subjected to simple linear regression analysis with the mean posttest scores in the PLST of both groups.

The linear regression equation for the PLST score in terms of ALST score is: PLST score = 28.21 + 0.4460 (ALST score). Results of the simple regression analysis indicate that the variation in the ALST scores does not significantly predict the variation of the PLST scores ($R^2 = 0.087$, $CI = 95\%$). Thus, it can be deduced from the findings that ALS does not significantly influence and predict PLS.
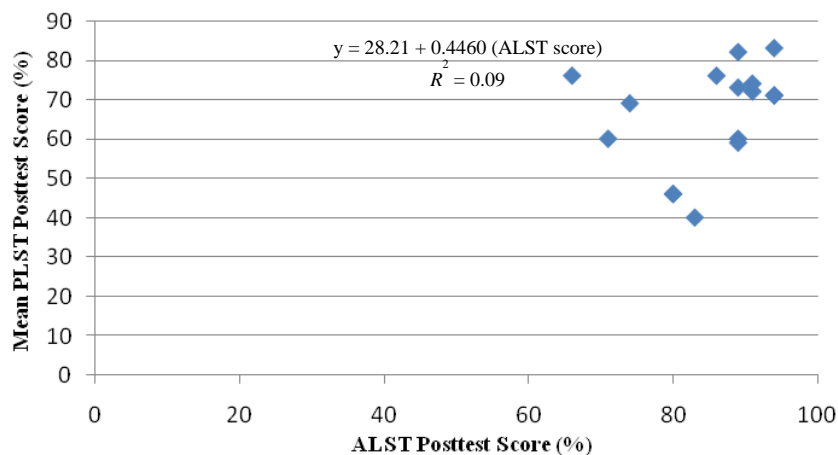
Figure 3. Linear regression analysis of the ALST and mean PLST posttest scores of the OSNBHE and NOSNBHE respondents.

Figure 4. Photograph of proper laboratory decorum used in the OSNBHE.

Figure 5. Video presentation on the Awareness and Practice of Laboratory Safety used in the OSNBHE.

DISCUSSION

Various studies have suggested that online social networking can directly influence social learning and can positively influence academic learning and learning outcomes (Mario, 2009; Weicha, Cheti, Pollard & Shaw, 2006; Yu, Tian, Vogel & Kwok, 2010).

Learning outcomes span three domains: cognitive, affective and skill-based (Kraiger, Ford, & Salas, 1993; Schmidt& Ford, 2003). The knowledge-based cognitive domain is associated with intellectual learning, and thus cognitive learning outcomes include knowledge, comprehension, and application. The attitudinal-based affective domain is related to emotional learning, feelings, being, relationships, and the ability to deal with situations. Affective learning outcomes include students' attitudes, satisfaction, and appreciation of the learning experience. The skill-based domain of learning outcomes concerns the development of critical thinking and the technical skills to solve problems or perform tasks (Yu, Tian, Vogel & Kwok, 2010, p.2). This study investigated the effects of the use of Facebook as a medium of instruction on the development of awareness and practice of laboratory safety among adolescent students. The results of the study suggest that online social networking can significantly improve students' awareness and practice of laboratory safety. This positive effect can be influenced by following factors characterized by and can be offered to users by online social networking.

According to the study by Yu and Tian et al., (2010, p.1), online social networking applications, such as Facebook, offer an efficient platform for college students' socialization by expanding their network scope and maintaining close relationships. Apart from its social significance, Facebook has been posited to contribute essentially in the educational sector. Thus, online social networking is bi-faceted: social and educational. Online social networking sites (SNS) users learn social or interpersonal skills facilitated by the SNSs features or configurations that can enable users to: enhance and maintain friendships, build social networks/establish virtual relationships, diminish barriers to making friends, follow peer trends, share photos, for fun and leisure and to keep in touch with family. On the aspect of learning, Facebook allows connectivity of the faculty and other students in terms of friendship/social relationship, provide comments to peers/share knowledge, share feelings with peers, join Groups established for subjects, collaboration: notification, discussion, course schedule, project management calendar and to use educational applications for organizing learning activities (Yu et al., ibid.).

Online learning has extended its scope of academic utility from the acquisition of fundamental skills (viz., interpersonal skills) to the improvement of learning in the field of medicine. The potential of online learning on improving learning outcomes in medical education has been recently investigated. In a study by Weicha et al., (2006), online learning caused learning improvement of medical students on Diabetes management case study as opposed to face-to-face learning.

Furthermore, this study suggested at least equivalence, if not superiority, of the online method of instruction against the face-to-face method of instruction--a finding consistent with other recently published, well-controlled studies evaluating effectiveness of online learning in medical education.
In addition, this study posited the multi-faceted effects of online social networking on learning and self-improvement as confirmed by related studies. In addition to its significance on the improvement of learning outcomes, social networking has been found out to essentially improve one's physical and psychological health. Recent research has illustrated that young people's online social networking behavior can bring them physical and psychological well-being (Ellison, Steinfield & Lampe, 2007; Steinfield, Ellison, & Lampe, 2008). Furthermore, several studies have investigated and affirmed the positive effects of online-based instruction to

students' self-regulation, which includes metacognitive, motivational, and behavioral factors of one's learning process (Mario, 2009).

Lastly, through this study, a promising future can be envisioned in theory, research, policy and practice on the use of online social networking as an alternative medium of instruction as compared to the teaching methodologies existent in an orthodox learning milieu. With online-based resources, students can have more opportunity to access, review and mimic lessons they uncover from these resources. Thus, the physical and time constraints a conventional classroom teaching is endowed with are overcome by the use of learning resources online. In the lecture-seminar method, students can only have a single opportunity to learn and interact with their mentor, thus the attainment of the retention of practice of laboratory safety among students poses to be a limitation in this method (Daniel, 1997; Lewis, Alexander & Farris, 1997).

CONCLUSION
This study investigated the effects of online social networking on the development of awareness and practice of laboratory safety among adolescent learners. After the treatment, the following conclusions were obtained: 1.) The exposure to the OSNBHE can improve students' awareness of laboratory safety. The improvement, however, is not significantly different from the improvement on the awareness of laboratory safety obtained through the students' exposure to the conventional method of lecture-seminar (NOSNBHE); 2.) Students exposed to OSNBHE performed laboratory experimentations more safely than students exposed to NOSNBHE; and, 3.) The awareness of laboratory safety does not influence and predict practice of laboratory safety.

In reference to the aforementioned results, this study provided a significant reference on the effectiveness of utilizing online social networking as an alternative medium of instruction in the discourse of health and safety education among adolescent learners. With the growing number of adolescent learners locally and internationally and inherent presence of hazards in the school laboratories, online social networking can essentially be utilized by academicians, school administrators, policy-makers, researchers and the like to lessen or eradicate accident occurrences in the laboratories. Thus, this study further posited the vast array of educational benefits that that 21st century's online-based resources can offer today and in the future.

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POTENTIAL OF VIDEO GAMES IN LEARNING BAHASA MELAYU VOCABULARY AMONG INTERNATIONAL UNIVERSITY STUDENTS IN MALAYSIA: A META ANALYSIS OF SELECTED JOURNALS

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ABSTRACT
This study uses a meta analysis to analyze several current articles published by selected journals by focusing on studies related to the potential of video games in Bahasa Melayu vocabulary learning by international students. Among the articles are those in journals such as *Computers and Education*, *Computers in Human Behavior*, *Education Technology Research Development*, *Procedia Social and Behavioral Sciences*, *Australian Journal of Language and Literacy*, *Computer Assisted Language Learning*, *Educational Technology & Society*, and *Scandinavian Journal of Educational Research* published between 2003 and 2011. For this study, only 15 articles were focused on out of 33 articles in journals published between 2003 until 2011. Nevertheless, only 9 articles were identified using the key words video games and language learning. In terms of methodology, most of the articles were literature reviews followed by case studies and experimental studies. Some articles combined quantitative and qualitative approaches. Findings from all the articles reviewed show that video games have potential as effective teaching aids and are capable of motivating students in language learning.
Keywords: Video games, Vocabulary, Language learning, Meta Analysis

INTRODUCTION
Recent commercial video games have long been in the market since they were first introduced in 1958 such that today they represent various types or genres (Kudler, 2007). Each genre of video game has its story line or narrative in various levels and characteristics. Part of the traditional video game contains genres such as '*first-person shooter*', '*role-playing*', '*action*', '*adventure*', '*sports*', and racing as well as strategy.

If seen from reality and research carried out in the west, many agree that video games have educational value and the potential for use as effective and enjoyable teaching aids as stated by Papastergiou (2009) and Moreno (2008). Discussion related to the potential of video game in education was done by Prensky (2001, in Papastergiou, 2009); the conclusion was that electronic video games have attracted the interest of academics who see the potential of video games as giving motivation to teenagers if the games are integrated with learning activities as stated by Prensky who had introduced electronic games as "digital game-based learning".

Studies by researchers in curriculum and instructional technology have found that computer and video games are among the most popular in designing video games suitable for learning needs (Squire, 2003). The views of other researchers such as (Betz, 1996; Jayakanthan, 2002; Jenkins & Klopfer, 2003; Prensky, 2001; Squire, 2003; Squire, 2005) as cited by Moreno (2008) on video games is that one way to enhance motivation and quality in learning is through use of video games as a learning tool. Video games represent an enjoyable and attractive element and this advantage should be absorbed in learning.

Papastergiou (2009) stated that several researchers agreed that the learning climate with video will be more enjoyable and effective compared with the traditional learning environment. Oblinger (2004) as cited by Papastergiou (2009) stated that video games have potential in changing the learning environment to one that is better based on several reasons; a) such games are multi-sensory, active, offer novel experiences, and problem based learning; b) give and increase experience and existing knowledge; c) provide fast feedback for hypothesis testing and learning based on action research; d) give opportunity to students to undertake self-assessment through scores; and e) enhance the social interaction environment between players or students.

Gamers can learn how to interact among themselves through their environment such as forming player groups online or "game-related information and resources" (Papastergiou, 2009). Several studies that have evaluated the use of video games in various academic disciplines such as mathematics, science, language, geography, and computer science have shown positive effect on student motivation and effective learning for achieving curriculum objectives (Papastergiou, 2009).

Furthermore, Tuzun (2008) stated that the future scenario for trends in video game technology in geography education is the application of 'MUVEs.' Researchers also have combined "three-dimensional (3D) environments" in designing computer video games in geography learning. Virvou, Katsionis, and Manos (2005) in Tuzun (2008), for example, have created the computer video game VR-ENGAGE for teaching geography subject to grade four students.

Besides that, the effectiveness in designing educational video games must be achieved by balancing the educational value with enjoyment in learning. According to Moreno (2008) this is because the teaching and learning process (T&L) requires effective teaching techniques to achieve learning objectives.

Three types of initiatives were suggested by Moreno to achieve effectiveness are: 1) multimedia approach is very much related to content presentation; 2) using existing video games in the market for learning; and 3) existing video games that have been developed must be balanced between education and enjoyment or pleasure in learning.

Hence, the learning of Bahasa Melayu now must change in the application of the latest technology so that it is aligned with developments in video game technology that has been integrated with various academic disciplines. With the use of this teaching aid, language learning can be implemented more effectively besides increasing student motivation.

Background on Bahasa Melayu Subject for International Students

Rusdi Abdullah (2001) stated that the flood of foreign students who come for further studies in public (IPTA) and private (IPTS) tertiary institutions in Malaysia is more pronounced. Consequently, the Education Act Amended 1995 clearly states that Bahasa Melayu is compulsory to be taught to all foreign students undergoing studies in IPTS. The above teaching is aimed at exposing students to the basics of Malay language such as phonology and spelling system, basic vocabulary, casual conversation, sociolinguistic aspects, reading and understanding simple examples and writing. According to Rusdi also, adult foreign language students have exceeded the critical period in the language learning process especially in mastery of sound (phonology) but they have advantages in other language aspects. Their knowledge of their mother tongue can help facilitate the learning process such as analysis of morphology aspects, syntax, and semantics of the language.

Awang Sariyan (2006) viewed that the Bahasa Melayu teaching program for international students is to fulfill the needs arising from the role of Bahasa Melayu as a language that is studied in various centers of learning all over the world. BahasaMelayu has its own position in the development of major world languages until there is a need for its teaching to foreign language learners although not as widely as the teaching of English.

Based on the experience of the International Islamic University Malaysia (IIUM), the Bahasa Melayu course for foreign students is compulsory for all foreign students at the university. According to Siti Baidura Kasiran and Nurul Jamilah Rosly (2011) in the context of Malay language learning, many foreign students taking first degree courses at IIUM learn BM as a third language. These students not only have to learn BM, they must pass it as a requirement for graduation. The Bahasa Melayu course for foreign students was made compulsory for all foreign students at IIUM as decided by the Senate Meeting in April 1991.

This course was split into two levels, Bahasa Melayu I for Foreign students (LM 1010) and Bahasa Melayu II Course for Foreign Students (LM 1011). The credit hours for this course is 50 minutes for every meeting/class and classes are held twice a week (Siti Baidura Kasiran & Nurul Jamilah Rosly, 2011).

Fa'izah Abd. Manan, Mohamad Amin Embi and Zamri Mahamod (2010) stated that the National Accreditation Council (LAN) or now called Malaysian Qualification Agency (MQA) has created the National Language Syllabus specially for foreign students. Among the aims and objectives of teaching Bahasa Melayu to foreign students in IPT in Malaysia are to enable them to master the basic skills in Malay language. Among the aims and objectives are:
  i. Know the speech system, rumi spelling system, vocabulary and grammar of Malay language;
  ii. Able to listen to and understand conversations in various daily situations;
  iii. Able to speak and understand simple reading materials and;
  iv. Able to express ideas and feelings in verbal and written form.

STATEMENT OF THE PROBLEM

Fa'izah Abdul Manan et al. (2010) noted that most foreign researchers of BM in Malaysia who follow the BM course in tertiary institutions found such courses to be facing problems, weak, and fail to impart the requisite

BM skills in the stipulated period. The present group of researchers quote the statement (Asmah, 2003; Fai'zah et al., 2009; Marzalina, 2005) that in many higher education institutions the method of teaching BM to foreign students still uses conventional teacher-centered approaches. According to Awang Sariyan (2006) in Fai'zah Abdul Manan et al. (2010) such approaches are deemed successful and can be determined as effective approaches after categorization by level and grouping according to the aims and needs of the foreign students who are learning BM.

Several researchers in Malaysia and the West concur that BM is a difficult language to master as a foreign language if the student learning it is not interested and lacking in confidence, has no need or motivation for the BM being learned (Jyh Wee Sew, 2005; Metzger, 2009; Pogadev, 2005, in Fai'zah Abdul Manan et al., 2010).

Based on the above problem situation, the Bahasa Melayu subject for international students is very much in need of teaching aids that are effective in overcoming the disadvantages in the use of conventional approaches in teaching and learning. Similarly with the problem of Bahasa Melayu that is said to be difficult to master resulting in students lacking in confidence, not wanting and not being motivated; all these might be overcome using video games as effective teaching aids capable of enhancing student motivation.

In Malaysia, many video games of various genres are in the market for commercial use and such games are the trend for teenagers and children today. In fact, the development of video game has crept into Bahasa Melayu learning especially for foreign students. The potential of video game in the curriculum has been studied at length by researchers and curriculum experts in the West who have long developed video games in education (e.g., Gee, 2003; Moreno, 2008; Papastergiou, 2009; Prensky, 2001; Squire, 2003).

Behind the debate on the issue of video game playing lacking potential in education as stated by Van Eck (2006, as cited by Moreno, 2008) who touched on the cost of developing video games, the difficulties in integrating video games into the curriculum; and Michael dan Chen (2006) who mentioned the need to evaluate the quality of video games in the learning process; Moreno (2008) suggested several alternatives or new approaches in focusing on a design for video games. Many video games of various genres in the industry have been identified as suitable for education. Existing commercially available video games also have potential for adaptation for use in learning; for example, the video game known as *SimCity* and *Civilization Sagas*.

In the context of language learning, studies on video games have been done by many researchers (e.g., Laleh & Nasrin, 2011; Muhammet Demirbilek, Ebru Yilmaz, & Suzan Tamer, 2010; Piirainen-Marsh & Tainio, 2009; Ranalli, 2008; Walsh, 2010; Yildiz Turgut & Pelin Irgin, 2009) and these have touched on the types of video games such as *The Sims*, *Massively Multiplayer Online Role Playing Games* (MMORPGs) and effectiveness of video games in language learning especially in English as a Second Language or English as a Foreign Language. Most research studies by the researchers mentioned were in the form of literature reviews and discussions. Studies have to be carried on with design of video game or developing video game prototype suited to language learning other than *The Sims*, MMORPGs and online video games.

Nevertheless, in Malaysia there exists a study by Kamisah Osman and Nurul Aini Bakar (2011) on the implementation and limitations of computer video games in Malaysia from the perspective of Chemistry subject, showing that curriculum design in video games is still new and in the research stage in Malaysia.

Video game in language learning was done on Arabic subject by Muhammad Sabri Sahrir and Nor Aziah Alias (2011). Their findings show that online video games succeeded in enhancing achievement, motivation and positive attitudes of students toward Arabic language learning. However, the video games developed were still limited; students hoped that these video games will continue to be used as teaching aids in Arabic language learning.

Because studies on video game playing in language learning were done mostly on English and Arabic, and because the approach for teaching BM to foreign students is still conventional in nature, we feel that this study is necessary to investigate the potential of video games in the aspect of BM vocabulary learning among international students. Hence, this study anticipates video games will become effective learning aids capable of enhancing the motivation in learning of Bahasa Melayu among international students.

OBJECTIVES
In general, this study is aimed at investigating the potential of video games in Bahasa Melayu vocabulary learning for foreign students. Shih, Feng, and Tsai (2008) stated that meta analysis is the best way to identify articles very much related to the field of study.

This study is implemented to answer the following research questions:
1. What is the percentage of research papers related to the chosen topic?
2. What were the titles of selected articles related to the potential of video games in learning Bahasa Melayu vocabulary for international students?
3. What methods were used in the selected articles related to the topic of research?
4. What is the comparison in research findings obtained from the articles?

METHODOLOGY
This study uses meta analysis to evaluate past research articles. Besides qualitative analysis, this study uses descriptive statistics to analyze data. According to Lipsey and Wilson (2001) meta analysis is a systematic technique for describing, analyzing, making conclusions on quantitative studies for some topic or question.

This study analyzes several current articles published with focus on studies related to the potential of video game in the Malay language (BM) curriculum for international students. Among the articles obtained were those from the journals *Computers and Education (CE)*, *Computers in Human Behavior (CBH)*, *Education Technology Research Development (ETRD)*, *Procedia Social and Behavioral Sciences (PSBS)*, *Australian Journal of Language and Literacy (AJLL)*, *Computer Assisted Language Learning (CALL)*, *Educational Technology & Society (ETS)*, and *Scandinavian Journal of Educational Research (SJER)*. Among the reasons for choosing these journals were: the articles in the journals were categorized under the journal articles of the Institute for Scientific Information(ISI) and development article and the articles were related to the theme title namely video game technology and curriculum or language learning. Meanwhile, only 15 articles were chosen from 33 articles published in the journals from 2003 until 2011 to be focused on in this study. However, only 9 articles were obtained using the key words video game in language learning.

RESULTS
Analysis of Articles
The research shows a total of 15 articles out of 33 published in eight journals between 2003 and 2011 were related to the potential of video game in vocabulary learning of Malay language for foreign students. Data were analyzed according to year of journal publication as shown in Table 1.

Table 1: Percentage of 15 Published Articles According to Selected Journals in the Meta Analysis (2003- 2011)

	2003	2007	2008	2009	2010	2011	Total (%)
CE	1(6.7)			1(6.7)			2(13.3)
CHB			1(6.7)				1(6.7)
ETRD		1(6.7)				1(6.7)	2(13.3)
PSBS				1(6.7)	2(13.3)	1(6.7)	4(26.7)
AJLL					2(13.3)		2(13.3)
CALL			1(6.7)		1(6.7)		2(13.3)
ETS						1(6.7)	1(6.7)
SJER					1(6.7)		1(6.7)
Total	1(6.7)	1(6.7)	2(13.3)	2(13.3)	6(40)	3(20)	15(100)

*Note.***CE**– *Computers and Education,* **CHB** – *Computers in Human Behavior,* **ETRD**- *Education Technology Research Development,* **PSBS** - *Procedia Social and Behavioral Sciences,* **AJLL**- *Australian Journal of Language and Literacy,* **CALL** - *Computer Assisted Language Learning,* **ETS** - *Educational Technology and Society,* **SJER** - *Scandinavian Journal of Educational Research*

Based on Table 1, the journals CE, ETRD, AJLL and CALL each recorded 13.3 percent, while CHB, ETS and SJER recorded 6.7 percent, followed by PSBS at 26.7 percent. From 2003 until 2011, the year 2010 recorded the highest percentage for articles in the selected journals, as much as 40 percent. Among all the eight journals selected, PSBS recorded the highest percentage of published articles on the topic, namely 26.7 percent.
 Titles of selected articles related to potential of video games in learning of Bahasa Melayu vocabulary for international students at Malaysian higher learning institutions
Subsequently, the title of the article was analyzed according to category. Studies were analyzed according to themes for categories in the articles reviewed. Among the categories derived from articles are:
Designing video games in education
Several views of researchers regarding video games with video educational value and enjoyable were stated by Aldrich (2004) in Moreno (2008); Aldrich stated that feedback received from students on video games was positive; students said the games enhanced their motivation. For example, 'The monkey wrench conspiracy' was

of the type 'first-person shooter' that used computer as a teaching aid. The same with 'Virtual Leader' that focused on teaching a complex subject such as the role of a leader. Video games in the form of 'action' such as 'Slow Pace', 'Reflection', 'Study of Environment', 'Problem-solving make point' and 'Click adventure games' are relevant from the pedagogical perspective.

Moreno et al. (2008) suggested that video game design should balance the pedagogical needs with the enjoyment factor that is difficult to understand; the second aspect is an issue more in the high profile entertainment industry. According to Moreno (2008) in general design of games can support pedagogical approaches with several characteristics: adaptation to real time, suited to learner needs, evaluation and grading in play as well as integration with online learning.

Brett and Jon (2011) said design of educational video game can enhance student motivation especially grade 9 students in English subject. Ricardo Rosas et al. (2003) observed that design of video game showed positive effect on student motivation through use of video game as an experimental tool in the experimental group for the subjects of mathematics, reading, and English language comprehension and spelling.

An Interactive Learning Environment
Video games are one of the channels of interactivity through the virtual world. A new learning environment has been shaped through video games online or through the internet. Ahmer Iqbal, Marja Kankaanranta and Pekka Neittaanmaki (2010) opined that the virtual world is able to enhance the need for interaction through social networks and heighten the experience of video game play.

Apperley (2010) suggested that cyber text shapes complex interaction or an action allowed in video games. According to Apperley, video games allow students to shape a wider social context. Besides that, application of virtual 3D through 3DVWs is able to expose students to interactive and collaborative learning environments (Ibanez et al., 2011).

Video Games Enhance Student Motivation
Dickey (2007) noted that Massively multiplayer online role-playing games (MMORPGs) are able to enhance students' intrinsic motivation. Dickey is supported by Peterson (2010) who found that MMORPGs showed enhancement of motivation and enjoyable learning in students through videogame-based interaction.

Papastergiou (2009) stated that video games based on physical and health education subject have the potential to motivate students to adopt a healthy and active lifestyle. Laleh Aghlara and Nasrin Hadidi Tamjid (2011) meanwhile found that students from their experimental group who learned language using video games were more motivated as compared to the control group taught using conventional methods.

Video Games in Language Learning
Based on findings of the study, video game use in language learning proved that video game playing has the potential to be an effective learning aid. Walsh (2010) noted that experiential learning shows that students as players practised systematic literacy practices through video game play in learning English curriculum. Yildiz and Pelin (2009) endorsed the effectiveness of video game playing in teaching based on online video technology based environment especially in learning vocabulary skills.

The use of video game as instructional support tool can also give positive effect on the way computer games are used in learning, the characteristics of play, appliances and class software infrastructure as well as the perception and attitude of teachers and students toward computer video games (Muhammet Demirbilek, Ebru Yilmaz, & Suzan Tamer, 2010). Ranalli (2008) stated that computer simulation games such as *The Sims* have potential for use in language learning programs especially in learning English as a Second Language (ESL) for students with varied backgrounds. Students are actively involved in collaborative video game activities in language subjects having flexible resources and students can undertake self learning in operating and experiencing playing of the video game (Piirainen-Marsh & Tainio, 2009).

Methods Used in Selected Articles
Data analysis of 15 articles found that all used one out of 5 methods consisting of literature review, case study, interview, experiment and mixed method.

Based on Table 2 there were 5 articles using literature review methodology, representing 33.3 percent of articles selected in the study; case study and experiment were represented by three articles or 20 percent respectively. Only two articles used the interview and mixed methods, representing 13.3 percent respectively.

Table 2: Methodology Used in 15 articles

No.	Methodology	Percentage (%)
1.	Literature review	33.3
2.	Case study	20
3.	Interview	13.3
4.	Experiment	20
5.	Mixed method	13.3

Based on Table 1, analysis showed the percentage of research findings obtained from the 15 articles. The findings obtained found that there were 8 types of potential video games discussed by the researchers in the articles. From the analysis, motivation recorded the highest percentage (40%), followed by interactions in social networks and experience of the students (13.3 % respectively), followed by other potentials such as pedagogy and enjoyment, effectiveness of online video games, positive instructional support tool, potential for use of computer simulation in teaching & learning (T&L) and interactive and collaborative – all of which charted the lowest percentage of 6.7 percent.

Table 3: Comparison between Findings on Video Game Potential in Articles Selected

No.	Potential of video game	Percentage(%)
1	Motivation	40
2	Pedagogy and Enjoyment	6.7
3	Social network interaction	13.3
4	Student experience	13.3
5	Effectiveness of online video game	6.7
6	Instructional tool for positive support	6.7
7	Potential of computer simulation in T&L	6.7
8	Interactive and collaborative	6.7

Hence, there were 15 articles out of 33 articles selected in this study, while 9 articles were obtained using key words video game and language learning. Meta analysis study is appropriate for evaluating the strengths and weaknesses for every article studies. This meta analysis represents a collection of all articles related to the topic and can be categorized as thematic whether according to method, title, sample and study findings in an effective way. Although meta analysis is only descriptive in nature without using field studies and real data, its effectiveness lies in evaluating and providing beneficial critique and encouraging other researchers to adopt an action plan to fill existing gaps in the literature with continuous research.

IMPLICATIONS AND CONCLUSIONS
According to Shih, Feng, and Tsai (2008), a meta analysis not only helps us to identify the title of the study, methods and latest trends but also enables us to know the influence and factors in the matters being investigated. The findings were collected in thematic form and were then summarized to see the overall direct effect of the article studied. Apart from qualitative analysis, this study also uses descriptive statistics to analyze data. Based on the findings, of eight selected journals, the journal *Procedia Social and Behavioral Sciences* (PSBS) recorded the highest percentage of 26.7 from the aspect of research paper analysis. From the viewpoint of method most preferred, 5 out of 15 articles used the method of literature review which recorded the highest percentage (33.3 percent). Comparative analysis showed that articles on motivation recorded the highest percentage or 40 percent. The overall finding from the articles was that video games have potential as effective teaching aids capable of enhancing student motivation in language learning.

Hence, this study helps researchers in identifying the limitations and gaps between previous research and the researcher's study. The researcher agrees with Yildiz and Pelin (2009) who stated that video game shows the effectiveness in language instruction based on the environment of online video game technology especially in learning language in vocabulary skills). The researchers also agree with the statement of Brett and Jon (2011) suggesting that design of educational video games is able to enhance motivation in students especially in Grade 9 students of English subject. Similarly Ricardo Rosas et al. (2003) stated that the design of video game has a positive effect on student motivation through the use of video game as an experimental tool for the experimental group in mathematics subject, reading, understanding and spelling (English). Hence, this meta analysis encourages researchers to study what previous researchers have not studied before and help the researchers to

obtain further information and subsequently carry out research on the potential of video games in learning Bahasa Melayu vocabulary among international students.

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THE EFFECT OF COGNITIVE LOAD ASSOCIATED WITH INSTRUCTIONAL FORMATS AND TYPES OF PRESENTATION ON SECOND LANGUAGE READING COMPREHENSION PERFORMANCE

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ABSTRACT
The effectiveness of instructional designs has been examined in several recent educational studies. Instructional design, both traditional and technology-based, can sometimes overload a learner's cognitive effort and thus negatively influence learning performance. The same learning material can induce different amounts of memory load as a result of differences in the instructional design used for its presentation. The present study aims to investigate the cognitive load effects of instructional formats (split-attention and integrated formats) and text presentation types (paper-based and online) on students' second language reading comprehension performance. In   a split-attention format, comprehension questions were placed at the end of the reading text, while in an integrated format, comprehension questions were physically integrated into relevant paragraphs of the reading text. The quantitative data was collected through reading comprehension tests from forty pre-service teachers in an English Language Teaching department. The result of this post-test-only experimental design study showed that there was no statistically significant difference across the four groups, Online Reading-Split Attention Format; Online Reading-Integrated Format; Paper-based Reading Split Attention Format; and Paper-based Reading Integrated Format, in terms of students' second language reading comprehension (L2) reading comprehension scores. On the other hand, the result showed that there was a statistically significant difference in L2 comprehension between participants who read online text and those who read paper-based text.

INTRODUCTION
The discipline of education has been heavily influenced by enormous advancements in computer technologies. Many research studies are being conducted to investigate the effects of technology-based materials on teaching and learning a language in the context of English as a Second Language (ESL) and English as a Foreign Language (EFL) (e.g., Genc & Gulozer, 2011; Genc, 2012). Many educators believe that the integration of computer technologies into instruction eases English language learning because both teachers and students can reach a great amount of resources, including authentic reading and listening materials, online dictionaries, and grammar and vocabulary exercises.

For the past two decades, the literature has focused on reading online texts and strategies that increase text comprehension. (e.g., Akyel & Ercetin, 2009**;** Anderson, 2003; Huang, Chern, & Lin, 2009)**.** Electronic documents provide new text formats for reading and new ways to interact with information that can cause difficulties for readers taught to extract meaning from traditional paper-based documents (Cairo, 2003 & Protopsaltis, 2008). According to Al-Shehri & Gitsaki (2010), online reading was found to be between 20% and 30 % slower than reading from paper-based materials based on '90s technology. However, current research studies indicate that the speed of both online and paper reading is comparable. Additionally, online ESL reading materials that have popup windows, hyperlinks to other web pages, link colors, images, video or audio files may distract students' attention. These kinds of features can prevent effective online reading because they increase individuals' cognitive load. Furthermore, Hung (2009) mentioned that reading comprehension questions placed at the end of the printed text split students' attention between the text and the questions. This process can increase individuals' cognitive load and decrease their comprehension. Therefore, the purpose of the present research was to investigate cognitive load effects of split attention and integrated formats and of text presentation types (paper-based and online) on students' second language (L2) reading comprehension. In a split attention format, comprehension questions were placed at the end of the reading text (see Appendix 1). In an integrated format, comprehension questions were integrated into relevant paragraphs of the reading text (see Appendix 2). These two reading formats were adapted from Hung's study (2009).

LITERATURE REVIEW

Sweller (1988) stated that cognitive load theory is an instructional theory derived from the field of cognitive science. According to Cierniak, Scheiter & Gerjets (2009), "the rationale of cognitive load theory (CLT) is that the designs of instruction impose cognitive load on learners' limited working memory and that the cognitive load in turn influences learning outcomes" (p. 315). If the complexity of the instructional materials is not properly considered, this will result in a cognitive overload. Increases in mental load because of incoming information are related to reduced performance on tasks. Therefore, several researchers have been trying to design instructional strategies and activities that decrease the amount of load (e.g Al-Shehri and Gitsaki, 2010; Hung 2009; Zumbach & Mohraz, 2008; Yeung, Jin & Sweller, 1997) (DeStefano &LeFevre, 2007). Cognitive load theory explains learning in terms of an information processing system involving long-term memory and working memory (Cooper, 1998). Working memory processes information by means of organizing, contrasting, or comparing. Our working memory is so limited that we can only deal with two or three pieces of information at the same time (Sweller, VanMerrienboer & Paas, 1998). This limitation, combined with too much information, reduces the effectiveness of learning outcomes (Paas, Renkl & Sweller, 2003; Sweller et al., 1998). Therefore, the limitation of working memory should be taken into consideration when designing instructional materials (Leahy & Sweller, 2004).

After new information is processed by limited working memory, the information is stored in the form of hierarchically organized schemas in long-term memory (Cooper, 1998; Kalyuga, Chandler & Sweller, 1997; Leahy & Sweller, 2004). For example, a language learner holds new words and new structures in his/her long-term memory according to the manner in which they will be used (Hung, 2009). These organized schemas can be brought from long-term memory to working memory as elements to be processed (Kalyuga et al., 1997; Paas et al., 2003). Another important learning process is automation. All information can be functioned either consciously in limited working memory or automatically without control of working memory. Automation, which is acquired through practice, reduces the cognitive load on working memory. For example, most skilled readers read without consciously noticing the letters because the letters have become automated in childhood. Unskilled readers and young children who are learning to read, however, approach each letter consciously to comprehend the text (Leahy & Sweller, 2004; Sweller et al., 1998). In order to construct knowledge as schemas in long-term memory, incoming information must first be processed in working memory. The total amount of mental activity imposed on working memory is known as cognitive load. Cognitive load theory makes distinction among three types of cognitive load that affects learning performance: intrinsic, extraneous and germane. Cognitive load that is created by the inherent complexity of the subject, rather than by instructional design, is named intrinsic cognitive load (Brunken, Plass & Leutner, 2003). For example, learning a foreign language word is intrinsically less demanding than learning the syntax of that language because sentence construction requires an understanding of the words that create a sentence, as well as the rules of word order and tenses (Antonenko & Niederhauser, 2010). Unlike intrinsic load, extraneous load is defined as unnecessary information processing which is caused by the instructional design itself (Cierniak, Scheiter & Gerjets, 2009). For example, for reading tasks in language classes, most of the reading comprehension questions are placed at the end of the reading text. Therefore, students are required to switch back and forth between the text and questions, holding the questions in their memory as they search for the answer (Hung, 2009). This is called split attention effect (Sweller & Chandler, 1991; Yeung, Jin & Sweller, 1997). Several research studies demonstrated how instructional materials can lead to demonstrating the split attention effect. These studies stated that the format of materials either increased or limited learning (e.g., Al-Shehri & Gitsaki, 2010; Hung, 2009; Kalyuga et al., 1997; Leahy & Sweller, 2004; Yeung et al., 1997).

Some instructional designs, both paper-based and online-based, impose high cognitive load, on learners working memory. Intrinsic and extraneous load are additive (Paas et al., 2003). Therefore, researchers suggest that instructional design of learning materials should be done carefully, especially when the intrinsic load, the inherent difficulty of the content, is high. An increasing extraneous load that results from the instructional presentation reduces working memory resources available for handling intrinsic and germane cognitive load (Paas, Vang Gog & Sweller, 2010).

The last type of cognitive load is germane cognitive load, which is beneficial and can lead to more effective learning. Germain cognitive load directs an individual's attention toward the learning process and is related to rich schema construction and automation. Automation of schemas overcome working memory load and decreases cognitive load. For example, frequently used skills like reading can be done automatically without a high level of conscious effort by a learner, though the associated tasks may be complex (Burkes, 2007). It is recommended by Ciernak et al. (2009) that "… an instructional design should reduce extraneous load (i.e., information processing hindering learning) and increase germane load (i.e., information processing supporting learning)" (p. 315). Although intrinsic load is unchangeable because it is integral to the subject matter,

extraneous and germane cognitive load can be manipulated by instructional design of the material. Therefore, the same learning material can induce different amounts of memory load based on the designs used for its presentation (Brunken et al., 2003).

Cognitive load theory recommends several instructional effects, including the split attention effect, the redundancy effect, and the imagination effect, for improving individual's learning performance. However, only split attention effect is of relevance to this study. Although there are many research studies examining the effects of instructional formats (split attention or integrated format) and text presentation type (paper-based or online-based) on learners' learning performance and cognitive load in fields such as science, geography, mathematics, and web-based education, few studies have been conducted in the field of English language education.

One of the most important studies that demonstrate the effects of instructional formats is by Yeung and colleagues (1997). In this study, five different experiments were conducted to investigate the effects of cognitive load for readers with different levels of expertise: 5th grade English speaking students, English speaking adults, 8th grade low-ability ESL students, and 8th grade high-ability ESL students. The aim of the study was to examine the effects of explanatory notes at both lexical level and semantic level through both the integration of vocabulary definitions into paper-based reading text (integrated format) and the placement of vocabulary explanation at the end of the paper-based text (split attention format). The result indicated that instructional formats (split attention and integrated format) used by different learners could yield different results. The authors stated that for 5th grade English speaking students and 8th grade low-ability ESL students, integrated vocabulary definitions resulted in higher comprehension scores but a lower score on a test assessing vocabulary meaning. Students learned better when the definitions were separated from the reading text. However, for English speaking adults and 8th grade high-ability ESL students, the opposite effect was found. The integrated format reduced reading comprehension but enhanced vocabulary learning. The researchers explained that for adult and high-ability ESL students, contrary to primary and low-ability ESL students, the presence of vocabulary meaning within the text increased cognitive load for comprehension. Thus, it reduced reading comprehension performance. On the other hand, for vocabulary learning, the integrated format reduced cognitive load and yielded higher scores in vocabulary learning performance.

Hung (2009) conducted a similar study with 21 adult ESL students to analyze the split attention effect in reading comprehension by comparing split attention and integrated formats. In the experiment, students were randomly divided into two groups and asked to read a paper-based text and answer the comprehension questions. The questions were placed either at the end of the text (split attention) or within the text (integrated). The study showed that the split attention format increased extraneous cognitive load and decreased learners' comprehension performance compared to the integrated format.

Al-Shehri and Gitsaki (2010) took a step further and explored the effectiveness of split attention and integrated formats on learners' cognitive load, and how they might facilitate second language online reading and vocabulary learning. For this study, 20 intermediate-level ESL adults were randomly assigned to four groups: 1) split attention with online dictionary, 2) split attention no dictionary, 3) integrated format with an online dictionary, and 4) integrated format no dictionary. Participants were asked to complete an online reading comprehension task. The result of the study showed that students who were in integrated groups performed better than students in split attention groups on reading comprehension tasks. Furthermore, students who used an online dictionary scored higher on the vocabulary test than students who did not.

In addition to studying the effect of instructional formats on learners' comprehension and cognitive load, researchers have also examined text presentation type of instructional materials. For example, Eveland & Dunwoody (2001) investigated the effects of presentation media, print text versus hypertext, on learners' perception of cognitive load. The study showed that there were no significant differences in perceived cognitive load across media (paper linear text, non-linear hypertext, and non-linear hypertext with navigation support).

Macedo-Rouet, Rouet, Epstein & Fayard (2003) conducted a similar experimental study with 47 undergraduate students. This study examined the effects of print and online presentations of multiple documents on readers' comprehension, perception of cognitive load, satisfaction, and attention. Contrary to the study of Eveland & Dunwoody (2001), Macedo-Rouet et al., (2003) found that hypertext caused higher cognitive load and poorer comprehension of documents.

These studies indicate that instructional design of reading materials, both paper-based and online-based, can affect a learner's cognitive load, and is therefore an essential element in determining reading comprehension performance in an ESL context. However, little effort has been spent to investigate the best instructional design and presentation conditions that facilitate English language learning in an EFL context such is found in Turkey. Therefore, the present study aims to investigate the cognitive load effects of instructional formats and text presentation types on students' second language reading comprehension performance.

RESEARCH QUESTIONS
The present study aims to investigate the following research questions:
1) What type of instructional format (Split Attention or Integrated Format) is more effective in facilitating L2 reading comprehension?
2) What type of text presentation (paper-based and online) leads to better comprehension in L2 reading?

METHOD
Participants and Setting
This study was conducted in an English Language Teaching (ELT) department in a state university in Istanbul, Turkey. Forty freshman, Turkish students between the ages of 19 and 21 were asked to participate in this study. All of the students were volunteer participants during the spring semester of the 2010-2011 academic year. The learners can be considered to have advanced level of English language proficiency during the present research because all were ELT pre-service teachers. Moreover, all of the participants reported that they were tech-savvy and used computers for e-mail exchange, word processing, chatting and surfing the Internet.

The present study was a post-test-only experimental design, in which students were randomly and equally divided into four instructional formats. Each group consisted of 10 students. The groups were: Online Reading-Split Attention Format (ORSA); Online Reading-Integrated Format (ORIF); Paper-based Reading Split Attention Format (PRSA); and Paper-based Reading Integrated Format (PRIF). The students who were in online groups (ORSA and ORIF) participated in the study individually in a computer lab in the school. The paper-based reading groups (PRSA and PRIF) participated in the study individually in their classroom environment. Before the reading sessions, participants were provided with a brief demonstration and information about how they would engage the tasks.

Materials and Process
Two of the four conditions were provided online (ORSA and ORIF). The other two conditions were paper-based (PRSA and PRIF). For online split attention and integrated format, two different Websites were designed. The ORSA was available at http://humeyragenc.tripod.com (see Figures 1and Figure 2) and the ORIF was available at http://humeyragenc.tripod.com/genc (see Figure 3). The PRSA and PRIF were designed as black and white printed materials for the study.
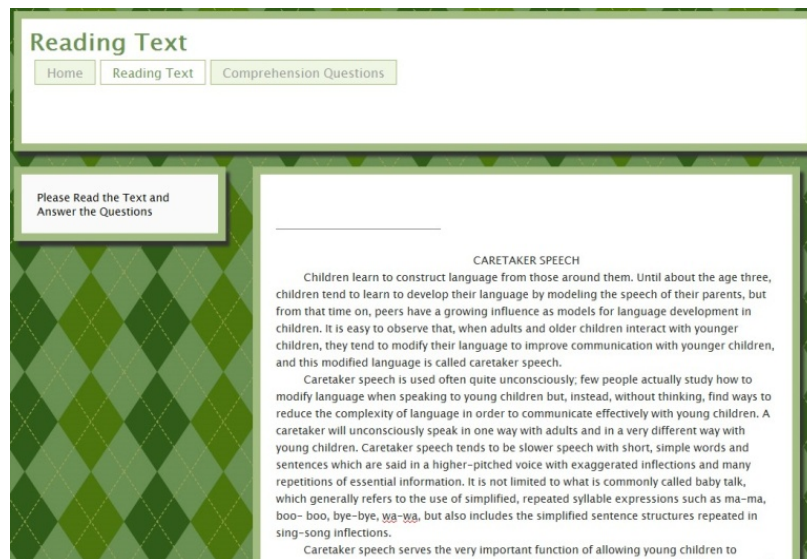
Figure1. A screen shot showing the reading text in ORSA
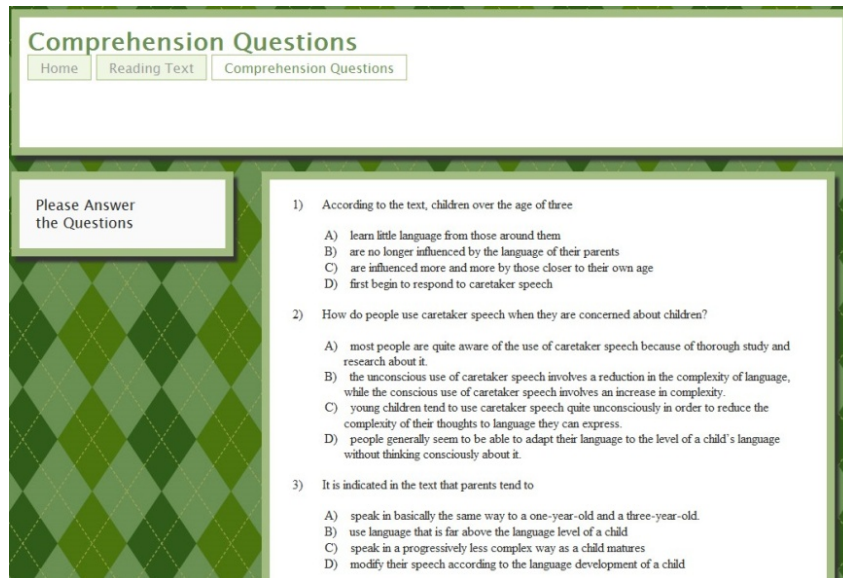
Figure2. A screen shot showing the comprehension questions in ORSA
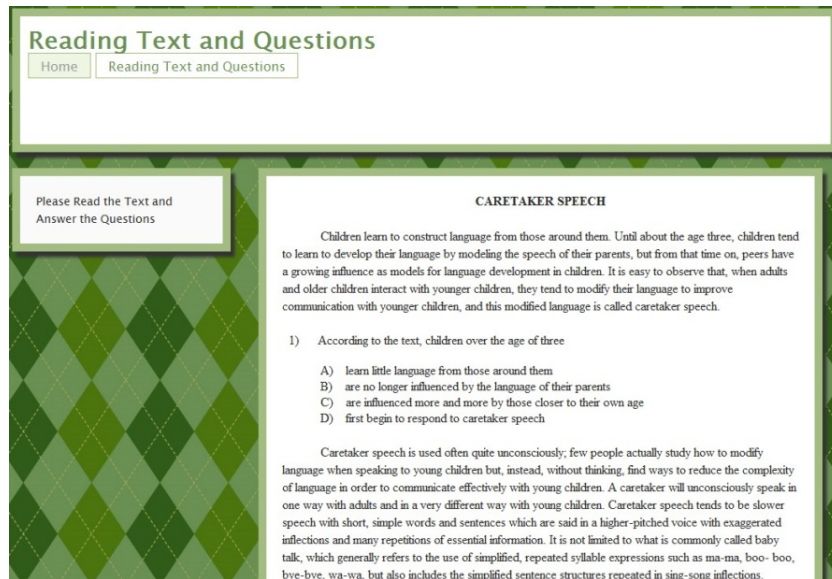
Figure3. A screen shot showing the reading text and comprehension questions in ORIF

All four conditions included a reading text and five multiple-choice reading comprehension questions. The reading text, "Caretaker Speech", which consisted of five- paragraphs and 606 words, was taken from Longman Preparation Course for the TOEFL Test: The Paper Test (Student Book with Answer Key and CD-ROM) book written by Phillips (2005). In order to eliminate the effects of background knowledge and provide an equal chance to all participants, the topic about speech development related to ELT courses was chosen. Thus, all students were familiar with the topic during the study. The comprehension questions were also taken from the same book, but two questions were paraphrased in order to eliminate unidiomatic language by the researcher.

For ORSA, the online text appeared on one Webpage and the comprehension questions were shown on a separate Webpage. In order to answer the questions, participants had to go back and forward between the reading text and the questions by clicking the "Reading Text" and "Comprehension Questions" icons. However, both the online reading text and the reading comprehension questions were shown on the same page for ORIF. Thus, the students did not have to switch back and forth between the pages to answer the comprehension questions. For both Integrated Formats (Online Reading Integrated Format and Paper-Based

reading Integrated Format), five reading comprehension questions were placed physically into the related paragraphs of the text.

Additionally, for PRSA, the reading text was shown on one paper-based page and the comprehension questions were shown on a separate page (see Appendix 1). Students switched from one page to the other in order to answer the comprehension questions. On the other hand, for PRIF, both reading text and comprehension questions appeared on the same page, with the questions placed physically near the related paragraphs of text, as in ORIF (see Appendix 2).

For the present study, the reading comprehension score was assigned as a dependent variable, whereas types of instructional formats (split-attention and integrated format), and presentation types (paper-based and online) were determined as independent variables by the researcher.

Data Analysis
The groups were considered to be equal in all respects because the participants were randomly and equally assigned to the groups. Each correct answer in the multiple-choice reading comprehension test was scored as 1 point. The maximum score on the test was 5. The data obtained from reading comprehension tests and reading speed were analyzed by using SPSS version 16.0. In order to identify the average scores in the reading comprehension tests and reading speed, inferential statistics, including t-test and Kruskal-Wallis test, and descriptive statistics were used.

RESULT
Reading comprehension scores according to instructional formats
In order to provide a depth of understanding about the cognitive effects of instructional formats and presentation types on students' L2 learning, several statistical analyses were applied in the study. Descriptive statistics and inferential statistics were conducted to analyze what type of instructional formats (Split Attention or Integrated Formats) is more effective in facilitating L2 reading comprehension. Since the number of the participants in each group was not close enough, there was no normal distribution across the four groups of subjects. Therefore, a nonparametric test called Kruskal-Wallis was conducted to find differences across the four groups of subjects in relation to L2 reading comprehension. The result of descriptive statistics (Table 1) shows that ORSA group had the highest mean value in the comprehension test. This indicates that participants in ORSA group performed better than all the other groups on the reading comprehension test. However, the PRSA group scored lowest on the test. The largest mean value difference was between the split attention groups (ORSA and PRSA). Participants who had online reading text performed far better than participants who had paper-based reading text. According to Table 1, the split attention group performed better than the integrated group in online presentation, whereas the split- attention group in paper-based presentation had a lower score than the integrated format group in paper-based presentation.

Table 1 Mean scores and standard deviation according to instructional formats

Groups	N	Mean	SD
ORSA	10	3.10	1.66
ORIF	10	2.00	1.15
PRSA	10	1.55	1.33
PRIF	10	1.63	1.20

Additionally, the Kruskal-Wallis test was used to determine whether there was a statistically significant difference across all four groups. The result of Kruskal-Wallis test (Table 2) shows that there was no statistically significant difference across the four groups in terms of students' L2 reading comprehension scores (sig(2-tailed) =. 06 ; p< 0.05). It seems that the reading comprehension score does not depend on instructional format difference in the present study.

Table 2 Kruskal-Wallis test result according to instructional formats

	Test Score
Chi-Square	7.12
df	3
Asymp. Sig.	.06

Reading comprehension scores according to presentation type

In order to find what type of text presentation (paper-based or online) leads to better comprehension in L2 reading, both descriptive and inferential statistics were conducted. Descriptive statistics (Table 3) shows that the online groups received higher mean values than paper-based groups in reading comprehension tests in the study. This result indicates that students in online reading groups performed better than students in paper-based groups on the test.

Table 3 Mean scores and standard deviation according to text presentation type

Groups	N	Mean	SD
Paper-based	20	1.60	1.23
Online	20	2.80	1.47

Furthermore, an independent sample t-test was conducted to see whether there was a statistically significant difference between the groups. As can be seen from Table 4, there was a statistically significant difference between students who did the reading task as online and students who did the reading task as paper-based in terms of L2 reading comprehension (sig(2-tailed) =. 008; p< 0.05). It seems from the study that reading comprehension scores are affected by differences in text presentation type.

Table 4 Independent sample t-test result according to text presentation type

	t-test for Equality of Means			
	t	df	Sig. (2-tailed)	Mean Difference
Test Score	-2.79	38	.008*	-1.20

*Significant at the .05 level

DISCUSSION

This research study, post-test-only experimental design, presents the findings of cognitive load effects of instructional formats (Split-attention and Integrated format) and text presentation types (paper-based and online) on ELT freshman students' second language reading comprehension performance.

The investigation of the cognitive load effects of instructional formats shows advantages of the Split Attention Format for reading comprehension, though there is no statistically significant difference across the four groups in the study. The participants in both integrated format groups (ORIF and PRIF) received lower scores than those in the ORSA (Online Reading-Split Attention Format) group. This finding is consistent with the result of Yeung, et al. (1997), as their study shows that vocabulary meanings which were integrated into the text reduced reading comprehension of English speaking adults and 8th grade high-ability ESL students. The authors claim that when vocabulary meanings are provided in integrated format, they become redundant and difficult to ignore during reading. Therefore, the rich knowledge of vocabulary increase students' cognitive load and decrease comprehension. However, split attention format allowed participants to ignore these vocabularies. On the other hand, the result of the present study contradict the findings of Al-Shehri & Gitsaki, (2010) and Hung, (2009), because these research papers indicate that students with integrated format presented better performance than the students with split attention format in reading comprehension tasks. The authors of these studies believe that split attention format, switching between the text and the questions, increases cognitive load, which in-turn leads to lower performance.

Based on the findings of cognitive load effects of instructional formats, participants with the split attention group compared to participants with integrated group did not suffer from cognitive load that leads to comprehension failure. According to the author of the study, the main reason for this finding is that participants were provided a topic in which they had strong background knowledge. The selected text, which was about speech development, was familiar with all ELT students in the study. Therefore, the author claims that providing comprehension questions through an integrated format caused redundancy for students who already had knowledge about the topic. Since students had to deal with redundant information during the reading, their working memories were overloaded, negatively affecting comprehension. On the other hand, in split attention, students ignored the redundant information and focused on what they were looking for in the text, without being cognitively overloaded. Thus, the increase in extraneous load decreased, rather than increased the cognitive load.

Another important finding deduced from the present study is that participants in online reading groups performed better than participants in paper-based groups in the reading task. This result contradicts with the findings of Macedo-Rouet, et al. (2003). In their study, the authors found that hypertext reading precipitated lower comprehension compared to print text. It was claimed that texts presented through computer screens increased students' perceived cognitive load. On the other hand, in a similar study, Eveland and Dunwoody (2001) did not find any significant difference in perceived cognitive load between the use of hypertext and print text for learning science subjects. The researchers believe that hypertext reading does not reduce learning because of increased cognitive load. This result confirms the findings of the present study as well. It is obvious that using online reading material did not reduce students' performance due to an increase in their cognitive load. In the study, all participants were proficient with computers, and were able to easily integrate computer technologies into both their personal and educational life. Reading on a computer screen, searching across the pages or going back and forth between web pages neither distract students' attention nor restrict their learning. Therefore, it can be claimed that the presentation of the reading material through hypertext, contrary to print text, leads to better comprehension and supported students' success in this research.

The present study provides ELT teachers few opinions about how to effectively and efficiently design instructional materials for students. The present research supports the use of online materials with a split attention format in reading tasks. Therefore, based on the students' needs, abilities and interests, teachers can integrate computer technologies into their English language instruction without concern about cognitive overload. This can be done by either selecting appropriate materials from the vast resources of the Internet or converting printed materials to hypertext, as was done in this study. The results of this study also support the use of online bilingual dictionaries to help facilitate students' learning, as the online reading with split attention format did not interfere with reading comprehension.

CONCLUSIONS
The findings of the present study bring us a step closer to understanding how instructional formats and text presentation types affect ELT students' reading comprehension, and how these independent variables are related to cognitive load theory in terms of text comprehension. The quantitative data collected through a reading comprehension test revealed two important results. First, participants in a split attention group performed better than participants in an integrated format group on the test. Second, students who read the hypertext performed better on the test than students who read the printed text. As a result, students in the online reading with split attention group outperformed the other groups in the study.

The present study revealed useful insights into second language online reading and instructional formats in terms of cognitive load theory. However, it has a few limitations. Although the results of the quantitative research provided important findings, small sample size may limit the generalizability of the results of this study. The data was collected from participants who were in an ELT department in Istanbul. Further investigation can be conducted with larger samples in a different department in a different geographic region. Furthermore, the author of the study theorizes that the result of the present study might be different if the same research were replicated with participants who have a low-English proficiency level, no prior knowledge about the topic of the text, and are less-skilled in terms of the Internet usage. Future research may also include a triangulation approach and longitudinal design to investigate the instructional formats and text presentation types in terms of cognitive load theory.

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Appendix 1

CARETAKER SPEECH
Children learn to construct language from those around them. Until about the age three, children tend to learn to develop their language by modeling the speech of their parents, but from that time on, peers have a growing influence as models for language development in children. It is easy to observe that, when adults and older children interact with younger children, they tend to modify their language to improve communication with younger children, and this modified language is called caretaker speech.

Caretaker speech is used often quite unconsciously; few people actually study how to modify language when speaking to young children but, instead, without thinking, find ways to reduce the complexity of language in order to communicate effectively with young children. A caretaker will unconsciously speak in one way with adults and in a very different way with young children. Caretaker speech tends to be slower speech with short, simple words and sentences which are said in a higher-pitched voice with exaggerated inflections and many repetitions of essential information. It is not limited to what is commonly called baby talk, which generally refers to the use of simplified, repeated syllable expressions such as *ma-ma, boo- boo, bye-bye, wa-wa*, but also includes the simplified sentence structures repeated in sing-song inflections.

Caretaker speech serves the very important function of allowing young children to acquire language more easily. The higher-pitched voice and the exaggerated inflections tend to focus the small child on what the caretaker is saying, the simplified words and sentences make it easier for the small child to begin to comprehend, and the repetitions reinforce the child's developing understanding. Then, as a child's speech develops, caretakers tend to adjust their language in response to the improved language skills, again quite unconsciously. Parents and older children regularly adjust their speech to a level that is slightly above that of a younger child; without studied recognition of what they are doing, these caretakers will speak in one way to a one-year-old and in a progressively more complex way as the child reaches the age of two or three.

An important point to note is that the function covered by caretaker speech, that of assisting a child to acquire language in small and simple steps, is an unconsciously used but extremely important part of the process of language acquisition and as such is quite universal. Studying cultures where children do not acquire language through caretaker speech is difficult because such cultures are difficult to find. The question of why caretaker speech is universal is not clearly understood; instead proponents on either side of the nature vs. nurture debate argue over whether caretaker speech is a natural function or a learned one. Those who believe that caretaker speech is a natural and inherent functions in humans believe that it is human nature for children to acquire language and for those around them to encourage their language acquisition naturally; the presence of a child is itself a natural stimulus that increases the rate of caretaker speech among those present.

In contrast, those who believe that caretaker speech develops through nurturing rather than nature argue that a person who is attempting to communicate with a child will learn by trying out different ways of communicating to determine which is the most effective from the reactions to the communication attempts; a parent might, for example, learn to use speech with exaggerated inflections with a small child because the exaggerated inflections to a better job of attracting the child's attention than do more subtle inflections. Whether caretaker speech results from nature or nurture, it does play an important and universal role in child language acquisition.

QUESTIONS
1) According to the text, children over the age of three

   A) learn little language from those around them
   B) are no longer influenced by the language of their parents
   C) are influenced more and more by those closer to their own age
   D) first begin to respond to caretaker speech

2) How do people use caretaker speech when they are concerned about children?

   A) most people are quite aware of the use of caretaker speech because of thorough study and research about it.
   B) the unconscious use of caretaker speech involves a reduction in the complexity of language, while the conscious use of caretaker speech involves an increase in complexity.

C) young children tend to use caretaker speech quite unconsciously in order to reduce the complexity of their thoughts to language they can express.

D) people generally seem to be able to adapt their language to the level of a child's language without thinking consciously about it.

3) It is indicated in the text that parents tend to

A) speak in basically the same way to a one-year-old and a three-year-old.
B) use language that is far above the language level of a child
C) speak in a progressively less complex way as a child matures
D) modify their speech according to the language development of a child

4) What is people's opinion about children's developing the use of caretaker speech ?

A) people who believe in nature over nurture feel that adults or older children who are around younger children will naturally make changes in their language.
B) caretaker speech is one of many natural functions that are used to stimulate young children to develop more rapidly.
C) the natural human tendency to acquire language makes caretaker speech unimportant in improving the rate of language acquisition by children.
D) it is human nature for children to develop the use of caretaker speech in order to take part effectively in conversations around them.

5) According to the text, it is not expected that someone who believes in nurture over nature
A) would believe that caretaker speech is more of a learned style of language than a natural one
B) would use different styles of caretaker speech with children in response to what is working best
C) would learn to use different styles of caretaker speech with different children
D) would use less caretaker speech than do those who believe in nature over nurture.

Appendix2

CARETAKER SPEECH
Children learn to construct language from those around them. Until about the age three, children tend to learn to develop their language by modeling the speech of their parents, but from that time on, peers have a growing influence as models for language development in children. It is easy to observe that, when adults and older children interact with younger children, they tend to modify their language to improve communication with younger children, and this modified language is called caretaker speech.

1) According to the text, children over the age of three

E) learn little language from those around them
F) are no longer influenced by the language of their parents
G) are influenced more and more by those closer to their own age
H) first begin to respond to caretaker speech

Caretaker speech is used often quite unconsciously; few people actually study how to modify language when speaking to young children but, instead, without thinking, find ways to reduce the complexity of language in order to communicate effectively with young children. A caretaker will unconsciously speak in one way with adults and in a very different way with young children. Caretaker speech tends to be slower speech with short, simple words and sentences which are said in a higher-pitched voice with exaggerated inflections and many repetitions of essential information. It is not limited to what is commonly called baby talk, which generally refers to the use of simplified, repeated syllable expressions such as *ma-ma, boo- boo, bye-bye, wa-wa*, but also includes the simplified sentence structures repeated in sing-song inflections.

2) How do people use caretaker speech when they are concerned about children?

E) most people are quite aware of the use of caretaker speech because of thorough study and research about it.
F) the unconscious use of caretaker speech involves a reduction in the complexity of language, while the conscious use of caretaker speech involves an increase in complexity.

    G) young children tend to use caretaker speech quite unconsciously in order to reduce the complexity of their thoughts to language they can express.

    H) people generally seem to be able to adapt their language to the level of a child's language without thinking consciously about it.

Caretaker speech serves the very important function of allowing young children to acquire language more easily. The higher-pitched voice and the exaggerated inflections tend to focus the small child on what the caretaker is saying, the simplified words and sentences make it easier for the small child to begin to comprehend, and the repetitions reinforce the child's developing understanding. Then, as a child's speech develops, caretakers tend to adjust their language in response to the improved language skills, again quite unconsciously. Parents and older children regularly adjust their speech to a level that is slightly above that of a younger child; without studied recognition of what they are doing, these caretakers will speak in one way to a one-year-old and in a progressively more complex way as the child reaches the age of two or three.

   3) It is indicated in the text that parents tend to

    E) speak in basically the same way to a one-year-old and a three-year-old.

    F) use language that is far above the language level of a child

    G) speak in a progressively less complex way as a child matures

    H) modify their speech according to the language development of a child

An important point to note is that the function covered by caretaker speech, that of assisting a child to acquire language in small and simple steps, is an unconsciously used but extremely important part of the process of language acquisition and as such is quite universal. Studying cultures where children do not acquire language through caretaker speech is difficult because such cultures are difficult to find. The question of why caretaker speech is universal is not clearly understood; instead proponents on either side of the nature vs. nurture debate argue over whether caretaker speech is a natural function or a learned one. Those who believe that caretaker speech is a natural and inherent functions in humans believe that it is human nature for children to acquire language and for those around them to encourage their language acquisition naturally; the presence of a child is itself a natural stimulus that increases the rate of caretaker speech among those present.

   4) What is people's opinion about children's developing the use of caretaker speech ?

    E) people who believe in nature over nurture feel that adults or older children who are around younger children will naturally make changes in their language.

    F) caretaker speech is one of many natural functions that are used to stimulate young children to develop more rapidly.

    G) the natural human tendency to acquire language makes caretaker speech unimportant in improving the rate of language acquisition by children.

    H) it is human nature for children to develop the use of caretaker speech in order to take part effectively in conversations around them.

In contrast, those who believe that caretaker speech develops through nurturing rather than nature argue that a person who is attempting to communicate with a child will learn by trying out different ways of communicating to determine which is the most effective from the reactions to the communication attempts; a parent might, for example, learn to use speech with exaggerated inflections with a small child because the exaggerated inflections to a better job of attracting the child's attention than do more subtle inflections. Whether caretaker speech results from nature or nurture, it does play an important and universal role in child language acquisition.

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    E) would believe that caretaker speech is more of a learned style of language than a natural one

    F) would use different styles of caretaker speech with children in response to what is working best

    G) would learn to use different styles of caretaker speech with different children

    H) would use less caretaker speech than do those who believe in nature over nurture.

THE EFFECTIVENESS OF THE CREATIVE REVERSAL ACT (CREACT) ON STUDENTS' CREATIVE THINKING: FURTHER EVIDENCE FROM TURKEY

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ABSTRACT

CREACT is a teaching tool that was developed based on the Janusian process and it can be used to improve students' creative thinking performance. Depending on the evidence of previous research which was carried out in language arts, it is found that CREACT is effective in improving students' creative thinking abilities. The purpose of this research study was to investigate the effectiveness of CREACT on students' creative thinking in drawing arts. The one group pretest-posttest design was used to carry out this research study. Nine lessons, including nine different concepts for each lesson, were designed and instructed by using CREACT during students' free time activities classes in a three week period. Participants were twenty-three 5th grade students from a public primary school. Findings indicated that CREACT is effective on developing students' creative thinking performance in drawing arts.

Keywords: Creative thinking, CREACT, the Janusian process

INTRODUCTION

A variety of definitions of creativity exists; the characteristics of creative individuals as well. Although creativity was created via questioning ability of mankind, the term creativity has been one of the most complex issues to be clearly defined till its creation. The world is full of similar, overlapping, and possibly synonymous terms (e.g., imagination, ingenuity, innovation, inspiration, inventiveness, muse, novelty, originality, serendipity, talent, unique), and definitions of each term vary widely (Plucker & Makel, 2010). However, it is possible to find terms like ability, reaction, capacity, process, person, product, uniqueness, novelty, etc. in most definitions of creativity. Authors of this article believe that the term creativity is quite much likely to be accepted as the ability of producing new ideas and/or products that are novel and/or unique and also useful and appropriate in any specific domains.

On the other hand, apart from creativity definitions, developmental issues in one's creative ability are quite crucial as well. To improve one's creative performance, it is believed that supporting him/her with enriched instructional environments and challenging strategies and/or tools for improving creative ability are particularly essential. In addition, this support can easily be related to some of the main research questions or research problems which have been arising in the literature of the domain of creativity. Naturally, the domain of creativity research creates its own questions that lead to an approach of questioning the most problematic issues in the domain. In addition, it is expected that a number of domain specific research questions on creativity will vary: revealing historical development, conceptions, definitions, measurement and assessment and improvement of creativity. Nonetheless, those varieties of questions are mostly related to humans, especially children and/or students.

One of the first questions to be addressed regarding creativity in children is whether or not children can actually be creative (Russ & Fiorelli, 2010). It has already been pointed out that there is a common way of thinking about creative acts: the concept of "Big-C" and "little-c" creativity (Richards, 2001). Simply, Big-C creativity requires significant contributions and discoveries in a domain, whereas little-c creativity can be considered as a novel, useful product or idea which has no great contribution in a particular domain. It is generally accepted that children's creative performance corresponds to little-c creativity. However, the question remains whether it is possible to shift children's little-c creativity level to Big-C creativity level? Research suggests that children are able to be creative, in the sense that they are able to come up with novel ideas in the context of their age and abilities (Russ & Fiorelli, 2010). From this point of view, the aim of the authors of this article is to address the question, whether or not creative performance can be developed.

A variety of methods, approaches, techniques and tools exist for the development of students' creative performance. Nickerson (1999) emphasizes that in most cases, direct and compelling experimental evidence of their effectiveness is lacking and continues that the likelihood that they will work, if used with good judgment, is high, and the chance they will do harm is small. This point also clarifies the significance of this research study. The main focus of this article is to show further evidence on the effectiveness of a new teaching tool named Creative Reversal Act (CREACT) on students' creative performance.

In this article, the aim of the authors was to present CREACT itself, its theoretical background and a recent experimental study on the effectiveness of CREACT on students' creative thinking in drawing arts. CREACT was developed by Sak (2009) based on the Janusian process that was originally operationalized by Rotenberg (1971). The Janusian Process, CREACT and its steps are reviewed below.

THE JANUSIAN PROCESS and CREACT

The Janusian process is defined as actively conceiving multiple opposites or antitheses simultaneously (Rothenberg, 1996). The term used for this process derives from the qualities of the Roman god, Janus, who had faces that looked in multiple (2, 4, or 6) diametrically opposite directions simultaneously (Rothenberg, 1999). Simply, the aim of this process is to develop opposite ideas in a given theory or concept and to construct new ideas by putting previous concepts and new concepts together simultaneously. This process stipulated that there were four phases: 1) *motivation to create*, which means the knowledge of important themes that lead a specific motivation to create, to produce something both new and valuable; 2) *deviation or separation,* which means one or both of the oppositional elements to be brought together are focused on or identified; 3) *simultaneous opposition*, which means pairs, sets, or series of opposites are simultaneously brought together in a conception that leads directly to the creative outcome; and 4) *construction,* which means modification, elaboration and application innovative insights and formulations (see Rothenberg, 1971; 1996). The painting in Figure 1 can be considered as an example of how Janusian process can be applied and influence a product in drawing arts.

FIGURE 1. Painting was painted by one of the authors of this article on the basis of the Janusian process. It represents a number of oppositions, contrasts, symmetries in shapes, colors (type, darkness), upside down views etc.

First published by Sak (2009).

CREACT was developed based on the Janusian process (Sak, 2009). Although the Janusian process has four phases, CREACT consists of five steps. These steps are: construction, segregation, opposition, combination, and elaboration (see Table 1). Brief explanations of each step are following: The purpose of the first step named *construction* is to stimulate students' interest and curiosity and raise their motivation about a particular concept or topic, and to help them learn more about it; thereby enabling students to heighten and/or construct motivation and knowledge to be able to produce creative results. The purpose of the second step named *segregation* is to identify critical thematic elements of the concept, theory or thesis discussed in the first step. The purpose of the third step named *opposition* is to identify or formulate opposites of the thematic elements identified in the

segregation step. The purpose of the forth step named *combination* is to bring simultaneously together the element(s) separated out in the second step and the opposites of these elements identified or formulated in the third step. The purpose of the last step named *elaboration* is that the configuration of simultaneous conception is revised and elaborated in a way the new conception sounds original even if it looks self-contradictory in meaning or retains converse structure (see Sak, 2009). Table 1 presents a detailed discussion form of CREACT including its steps, focus questions and actions. And also a clear example can be found at the appendix I which was produced by one of the authors of this article focusing on the concept "war".

TABLE 1. CREACT Discussion Form

Steps		Focus Question	Behavior/Action
1.Construction		What do we know about this theory, idea, or concept? What are the uses of it for us? What else should we know about it?	Explore the theory from multiple perspectives.
2.Segregation	a) Segregate the concept into components	What are some components of this theory, idea, or concept? What makes this theory, idea or concept?	Identify and separate out major components of…
	b) Segregate components into elements	Can we separate out this component further? What are some elements of this component?	Identify and segregate distinct elements of a component.
3.Opposition		a. What is the opposite(s) of this element/component? b. How are they opposite to each other on a scale/category/plane/space? c. How is this opposite you just have identified as valid/true as its opposite?	1. Generate opposite(s) of each element. 2. Evaluate specificity of opposites. 3. Determine whether opposites are as true as previous ideas.
4.Combination		a. Which opposites can be used together in a new conception? b. Why can these opposites go together in a new conception?	Identify whether two or more opposites can be used together in a new conception.
5.Elaboration		a. How is this new conception comprehensive enough to sum up the entire dimension of the new conception? b. How does the new conception possess symmetry? c. In what ways can we revise this new conception?	Evaluate whether the opposites hold symmetry, specificity and sum up the entire dimension of the new conception.

Adapted from Sak (2009)

PREVIOUS RESEARCH

The effectiveness of CREACT was previously investigated by Sak & Oz (2009). This single research study was carried out with students from a social sciences high school. It was a one group pretest-posttest design and the treatment process took 3 weeks including 6 lessons using CREACT. Students' creativity was pre and post-tested via 3 tasks: a poem task, a story task and a paradox (es) task. It was found that CREACT improved students' creative performance significantly on the poem and story tasks, but had a low effect on their creative performance on the paradox (es) task. Overall findings of this research study showed that CREACT is useful for developing and improving students' creative thinking.

PURPOSE of the STUDY

The purpose of this research study was to investigate the effectiveness of CREACT on students' creative thinking in drawing arts. The question that was written below is the simple research question of this research study.

- How much effective is CREACT on improving students' creative performance in drawing arts?

In addition, hypothesis which were planned to be tested, derived from the research question and given below.

- $H_{0.I}$ = There is no significance of difference between experiment group statistic and population parameter.
- $H_{0.II}$ = There is no significance of correlations between subtasks and main task scores.
- $H_{0.III}$ = There is no significance of difference between pretest and posttest scores.
- $H_{0.IV}$ = There is no interaction between gender and pretest scores.
- $H_{0.V}$ = There is no interaction between gender and posttest scores.

METHODOLOGY
STUDY GROUP
26 students from a 5th grade class of a public primary school attended this research study and were taken pretests. The public primary school was located in a suburban area of Eskisehir, Turkey. Depending on standardized achievement test scores, this school's achievement performance was almost average among all public primary schools in Eskisehir. Most of the students' families were at low socio-economic status. Finally, a total of 23 students completed both pretests and posttests. %52.2 (n=12) of the students were boys and %47.8 (n=11) were girls. All of the students' mean age was 120.95 months with a minimum of 115 months and a maximum of 127 months. The age range was 12 months.

Fraenkel & Wallen (2006, p.269) stated that one of the essential characteristics of experimental research is random assignment of subjects to group(s). The subject group of this research study was not randomized because there was only one group of students which was convenience for the study. Yet, it has to be considered that it is almost impossible to create a group by randomization in public schools. By the way, authors of this article believe that when students are being enrolled in a public school, they frequently have almost equal chances to attend in any classrooms.

RESEARCH DESIGN
The one group pretest-posttest design was used to carry out the research study. The dependent variable of this study was students' creative performance and the independent variable was CREACT. It took 3 weeks for the treatment process. Pretests and posttests were performed during two days period before and after the treatment process. Nine lessons, with different concepts for each lesson, were planned and instructed using CREACT during students' free time activities classes. The concepts were play, technology, education, arts, examination, talent, money, freedom and media. These lessons were carried out three times a week once every two days after one lesson. The classroom teacher was trained in CREACT and the research process over two sessions. After the training, she guided the pre-planned lessons with CRAECT to his/her own classroom. Also, the teacher was asked to collect the activity forms of students after each lesson and all of those activity forms were checked by the authors. CREACT is a kind of self-actualized activity and students are independent during CREACT discussions.

INSTRUMENTATION
The testing instrument consisted of three subtasks: conceptualization, drawing and painting. Students were asked to conceptualize, to draw and to paint a painting on a given concept. The given concept was "future". Conceptualization, drawing and painting were the subtasks of the main task. In each subtask, students were given an instruction whereby they had to perform each subtask using as many as oppositions and/or paradoxes as they could have. During the test, students were completely independent in taking the subtasks in any order. Total time for testing was 60 minutes for each student. The reliability coefficients of pretest and posttest were .92 and .88 (Cronbach's Alpha). These reliability coefficients indicated that both pretest and posttest had a high reliability.

DATA ANALYSIS
Initially, students' drawings were examined by two art teachers and two authors of this article. For each subtasks, scores were decided upon as to probable categories from which quantitative data from pretests and posttests could be derived. 4 categories for the conceptualization subtask, 8 categories for the drawing subtask and 4 categories for the painting subtask were determined. Students' pre-tests and post-tests were scored via the categories for each subtask. The scores that were derived under the categories were calculated based on three types of scores: fluency, flexibility and creativity. Fluency is operationally defined as the number of responses to a given stimuli (Runco, 1999, p.577). The fluency score means true usage of oppositions and paradoxes. Flexibility is operationalized as the number and/or uniqueness of categories of responses to a given stimuli (Guilford, 1968, p.99). Flexibility scores were calculated via log_x formula from fluency scores. The sum of fluency and flexibility scores forms the creativity score. For each test, the sum of the three subtasks' creativity scores was used as a total creativity score to compare the mean differences between students' pre-test and post-

test scores. Two authors of this article scored both pretests and posttests. The inter-rater reliability coefficients were .93 for the pretest and .92 for the posttest. These coefficients indicated that there was a strong consistence between two art teachers' scores.

There were 26 participants in this study at the beginning. After checking the eventual data, it was seen that 2 of the students had not taken the posttests. Those 2 students were taken out of the research group. Besides, it was seen that one student (number 18) scored extremely high in both pretest and posttest (see Figure 2). That student was behaved as an outlier and taken out of the research group. The total subject number was 23.

FIGURE 2. Boxplots of pretest and posttest scores
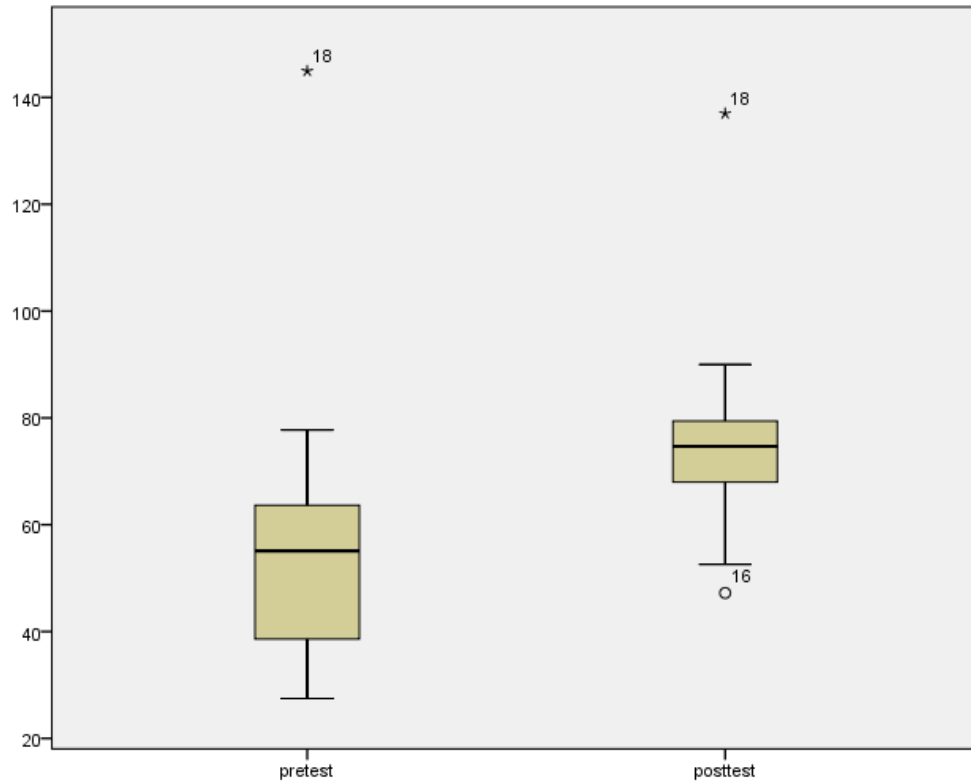
Correlations among subtasks and the main task were calculated to determine whether or not the usage of total creativity scores would be reliable. To test the assumption of normal distribution, the Shapiro-Wilk Test was run for both pretest and posttest scores. To compare the mean differences of pretest and posttest scores, Paired Samples T-test was run. Mean scores, standard deviations and effect size, were calculated. To control the internal validity, the interaction effect between students' gender and CREACT was checked using the One-Way MANOVA. For all of the statistical analysis, SPSS 20.0 was used and procedures that were suggested by Pallant (2011) were followed.

FINDINGS
ASSUMPTION of NORMAL DISTRIBUTION
It has already been stated that the sample size of the group was 23 (less than 30), therefore, it was checked if the distribution was normal or not. The Shapiro-Wilk test results indicated no violation of the hypothesis of $H_{0.I}$ and statistics also supported that the distribution was normal (p=.474 for pretest, p= .140 for posttest, df=23, p>.05).

CORRELATIONS among SUBTASKS and MAIN TASK
Table 2 presents the correlation coefficients among subtasks and the main task. Correlation coefficients among subtasks varied from .09 to .64 and all coefficients were found significant except painting subtask and drawing subtask. However, correlation coefficients between subtasks and the main task varied from .65 to .88 and all coefficients were found to be significant. Therefore the hypothesis of $H_{0.II}$ was violated. From this point, the sum of subtask creativity scores were used as a main task creativity score for each subject.

TABLE 2. Correlations among Subtasks and Main Task

	Drawing Subtask	Painting Subtask	Conceptualization Subtask	Main Task
Drawing Subtask	1			
Painting Subtask	.09	1		
Conceptualization Subtask	.49*	.64**	1	
Main Task	.78**	.65**	.88**	1

* Correlations are significant at .05 level;
** Correlations are significant at .01 level

COMPARISON of STUDENTS' CREATIVE PERFORMANCE on MAIN TASK

As seen in Table 3, the number of students who took both pretest and posttest was 23. The students' pretests mean score was 52.32 with a standard deviation of 14.56 and the posttests mean score was 71.95 with a standard deviation of 10.20. The mean difference between pretest and posttest mean scores was found to be significant, t (22) = -7.51, p<.001 and the hypothesis of $H_{0.III}$ was violated. The mean increase in creativity scores was 19.63 with a 99.9% confidence interval ranging from -25.1 to -14.2. The magnitude of the effect size of the mean difference between pretest and posttest mean scores was calculated as .71. Cohen (1988) suggests that .01=small effect, .06=moderate effect and .14=large effect. The effect size of .71 indicated a large effect.

TABLE 3. Pretest and Posttest Mean Scores, Standard Deviations, T-Test Results and Effect Size

Measures	N	$\overline{X}$	SD	t	df	p	Eta² (d)
Pretest	23	52.32	14.56	-7.51	22	.000	.71
Posttest	23	71.95	10.21				

p<.001

To control the internal validity of this research study, some procedures were followed. First, to control the implementation threat, an 11 itemed self-checklist designed by the authors was used by the classroom teacher during the lessons which were carried out using CREACT. Second, to control the interaction effect on students' gender, significance of mean differences for pretest and posttest scores were analyzed by running the One-Way MANOVA. After assumption testing for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices and multicollinearity; no serious violations was noted. Consequently, the ONE-WAY MANOVA statistics indicated no violation of hypothesis of $H_{0.IV}$ and $H_{0.V}$ which concluded that no significance of differences between boys' and girls' pretest and posttest mean scores (F (2, 20) = .80, p= .46, Wilk's Lambda= .93) were found.

DISCUSSION and CONCLUSIONS

In this article, the effectiveness of CREACT on students' creative thinking was presented. Findings showed that CREACT improved students' creative performance and the calculated effect size was large. This finding supports the previous research findings of Sak & Oz (2009). From this point, especially in classroom environments, discussions with CREACT can be conducted and this will help to develop students' creative performance and creative thinking.

Assuming that most people have some creative potential and have some high-level potential, the next question is how to evoke, access, stimulate, train, or develop the creative potential (Feldhusen, 1995). Most researchers are quite certain that creativity can be taught and/or improved. And it is possible to state that a crucial need of evidence in developing the creative ability is essential, especially teaching creatively. However, one can teach students more creatively (Sternberg & Williams, 1996; Williams, Markle, Brigockas, & Sternberg, 2001; Sternberg, 2006). And one way to succeed in teaching creatively can be the tool named CREACT.

A controversial issue in developing creativity is long term versus short term interventions effect in changing creativity. It is asserted that changes in creativity occur over long periods of time (Runco & Pezdek, 1984). Reversely, there is evidence on the effectiveness of some short term interventions on the development of creativity. This experimental research study was one similar to those short term interventions and supported the idea of short term interventions can also be effective in changing creativity positively.

By the way, it has to be considered that the purpose of CREACT was not to teach students how to draw or paint, but to develop their thinking skills through the Janusian process (Sak & Oz, 2009). In this research study, authors only examined the opposite and paradoxical conceptions included in the Janusian thinking process, via concepts, painting and the figures that they drew. Also, findings proved that children's conceptualizations included oppositions and paradoxes which they developed by the process and by the implication of CREACT. Thus, the question as to whether creativity can be developed was confirmed by the findings of this research study. Furthermore, as Nickerson (1999) stated that direct and compelling experimental evidence of the effectiveness of creativity developing strategies is lacking; so, this study made a contribution to dispel this lack.

In addition to everything, it is possible to discuss that creativity fostering teacher behaviors are also crucial to encourage students' creative ability. The teacher can also indirectly influence student creativity by creating a supportive social environment through her words and deeds (Soh, 2000). From this point of view, using the tool CREACT can possibly be a part of classroom environment and can help in improving teachers' creativity fostering behaviors. Additionally, a research aimed on the effectiveness of CREACT on teachers' creativity fostering behaviors is strongly recommended.

Last but not least, there are some limitations to this research study. This current research and the previous research were both one group pretest-posttest designs. This type of experimental research was frequently classified as weak experimental designs or pre-experimental designs. Results could be more acceptable and reliable if a further research on the effectiveness of CREACT on students' creative performance is conducted with a control group and a random assignment. So, authors of this article also suggest an experimental research with a control group and a random assignment, which focuses on the effectiveness of Janusian process and CREACT on developing students' creative performance.

To sum up, there are many factors that contribute to one's creativity and the developmental process of his/her creativity or creativities; but perhaps there is more than one kind of creativity (Sternberg, 2005). When developing creativity, we can develop different kinds of creativity, ranging from minor replications to major redirections in thinking (Sternberg, 2006). In classroom context, flexible and effective teaching tools are much likely to be accepted as one of the most crucial factors as a contributor for developing a variety of creativities. A flexible and effective teaching tool called CREACT has the potential to improve students' creative performance and creative thinking, perhaps from different aspects. The authors of this article previously experienced that CREACT is flexible enough to be implemented in a variety of lessons and topics. Evidently, this new technique can be considered as a useful teaching tool to develop students' creative thinking. It is recommended to teachers and/or trainers that CREACT be used in the classroom or in any kind of teaching environments.

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APPENDIX 1: A Sample Output of CREACT

Concept= WAR
Step I
Construction

What does "war" mean to you?
- War is fighting each other.
- War is killing of people.
- War brings life itself.
- War is a confliction.
- War is nonsense.
- War is a necessity.
- War is a crime.
- War brings peace itself.
- War sheds blood.

Step II	**Step III**
Segregation	*Opposition*
What constitutes "war"?	What are the oppositions of the elements that you've written on step II?
- War is arming. *War is enslavement.* *War is heroism.* - War is a separation. *War brings death itself.* - War is a massacre. - War is a blood shed.	- War is disarming. *War brings freedom itself.* *War is a cowardliness.* - War is unification. *War brings life itself.* - War is saving lives. - War is a binding up wounds.
Step IV	**Step V**
Combination	*Elaboration*
Which oppositions can be used to redefine the term "war"?	How can we change this new concept?
War is the heroism of cowards. *War brings death instead of life itself.* *War is an enslavement of freedom.*	***War is the heroism of cowards who bring death in lieu of life itself thereby enslaving the freedom of mankind.***

THE INTEGRATION OF AUTHENTIC LEARNING PRINCIPLES AND FACEBOOK IN SERVICE LEARNING

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ABSTRACT
To date, lots of research was carried out solely on the effectiveness of Authentic Learning principles in service learning. The results showed positive relationships between theories and practices because students had become relatively analytical thinkers, problem-solvers and collaborators. The uses of Authentic Learning and Facebook in service learning, however, are under research. Hence, this paper tends to investigate the effectiveness of Authentic Learning Principles and Facebook in promoting active learning among students in their service learning curriculum. These students are from Albukhary International University (AiU) whereby service-learning curriculum also known as Community Engagement Project (CEP) has been introduced to all undergraduate students across their 3-year curriculum. Purposive samplings were employed to find out the students' preferences in using Authentic Learning Principles together with Facebook as a social media tool in their service learning projects. Surveys which consisted of Likert-scale questions were administered to ninety-six (99) students from 20 different countries. Fifty-one percent (51%) of the students were males and the other forty-nine (49%) were females. The results have shown that Authentic Learning Principles and Facebook as a tool of communication have effectively enhanced students' learning experience in service learning.
Keywords: Authentic Learning Principles, Facebook, Service Learning / Community Engagement Project

INTRODUCTION
Albukhary International University (AiU) is established under the concept of "Waqf" – a charitable university which offers full-fledged scholarships to the underprivileged students during the duration of their studies. The ultimate goal of the concept aims at providing equal education opportunities to academically qualified students from disadvantaged, underprivileged and marginalized backgrounds. In line with the ultimate goal, the students are expected to possess good characters in terms of valuing discipline, being caring and generating contributions to the society upon their graduations. It is also a model university to the world characterized by high quality and relevant education and universal humanitarian values. In order to produce students who have good characters and experience in social activities, they are requested to participate in planned service learning projects during their course of studies. The service learning projects provide an authentic learning phenomenon in which they have to employ real-world and discovery-based problem solving skills to resolve the problems. They are expected to learn the passion to serve and the meaning of contribution for the betterment of the society. Previous research on the integration of authentic learning in service learning projects showed positive outcomes because they had become relatively analytical thinkers, problem-solvers and collaborators (Brown, 2002; Lombardi, 2007; Tan, Teo & Chy, 2009). Technological-based authentic learning also presents its significant role in creating and applying new knowledge by using higher thinking cognitive processes (Churchill, 2005). Hence, this paper tends to investigate the effectiveness of authentic learning and the use of Facebook as a social media tool in the process of students' active involvements in the service learning projects.

LITERATURE REVIEW
Authentic Learning in Service Learning Environment
Authentic learning (Herrington & Kervin, 2007), also known as experiential learning, has created a new paradigm shift for students because it dismisses rote learning. The principles of authentic learning promote learning knowledge and skills useful in real life (Collins, 1988), link the classroom theories with real world practices (Bennett, Agostinho & Lockyer, 2002; Borthwick, Bennett, Lefoe & Huber, 2007), develop problem solving skills and construct knowledge (Hui & Koplin, 2011) during the authentic activity learning process. Research has also shown the fact that students who have engaged in authentic learning activities tend to have the flexible competency such as "the judgment to distinguish reliable from unreliable information, the patience to follow longer arguments, the synthetic ability to recognize relevant patterns in unfamiliar contexts and the flexibility to work across discipline and cultural boundaries to generate innovative solutions" (Chang, Lee,

Wang & Chen, 2010, p.1572). Lombardi (2007) further commented that authentic learning activities can go beyond the content of curriculum where students are exposed to different disciplines and cultures. Consequently, students can face and manage their problems easier because the higher order of thinking skills they possess give them strength to make the right decision in their future working atmosphere (Herrington & Kervin, 2007; Lombardi, 2007).

Service learning has become the curriculum in higher education institutions which aims to improve the quality of live especially to underprivileged and maginalised people on a voluntary basis. It gives authentic contexts to students to apply their knowledge and skills. Therefore, students are encouraged to be involved in service learning which provides authentic activities. Students can learn new experience by real experience and they can remember the content for a long time (Ammon, Furco, Chi, & Middaugh, 2002). Apart from this, the students learn about social responsibilities such as being empathic, ethical and helpful to needy people in their surroundings (Berham, 2006; Ikeda, 2005; Wigginton, 1985). Such learning experience also certainly enriches the life of learners in schools. Erlich (1996) and Furco (1996) had clearly stated that students best learned not by the printed materials but experiences. Jacoby (1999) further explained that service learning is the authentic activity which accommodates "human and community needs" besides being a popular activity and contextual relevant to culture and experiential learning (Settle & Smith, 2008). In addition, service learning requires participants to give up their time, comfort and finance (Perold & Omar, 1997) for the benefits of others. In this process, students have to be self-sacrificed to handle and solve the complicated problems externally and internally. Learners are given opportunities to strengthen their skills of thinking process as they freely explore, discuss, reflect, construct concepts from the project they are involved (Mims, 2003). Positive characters such as team-spirit, leadership, conflict resolution, communication, organization, and time management (Tucker, McCarthy, Hoxmeier, & Lenk, 1998) are inculcated when they are committed to service learning. A previous research (Campus Compact 2005) showed that 95 percent of interviewees recognized and accept the outcomes of positive character building through service learning. With the positive outcomes, the students are able to make use of their existing good characters, knowledge and skills in their real-life. They are the practicalities of authentic learning activities in service learning.

Authentic Learning in Facebook (Social Networking)
Because of the popularity and usefulness of social networking, teaching and learning from the traditional setting has now moved to the virtual world setting. Previous research in Malaysia mainly focused on interface design and interactive multimedia elements (Sivapalan & Wan Fatimah, 2010) which did not offer authentic learning contexts and activities for students to interact. The focus on authentic learning in social networking particularly in the use of Facebook is under research.

The invention of Facebook, a popular communication tool, has offered the virtual communities for students to communicate. Facebook has broken its records of active users from 350 million in 2010 (Facebook, 2010) to 526 million in 2012 (Facebook, 2012). The drastic increase of users has signified its existence not only as a communication tool but also an avenue for the people to share their leisure and lives. It is also a tool to befriend and simultaneously joins the connections and interactions from a physical setting into a virtual world (Wang, Chun, Yu & Wu, 2013). Shih (2013) has proven that the virtual world in Facebook is enticing because users are given the opportunities to "exchange, interact, collaborate and socialize" (p.52) with other people. Before its invention, multimedia technologies which lacked of interactive components were regarded as inhumane and the community felt bored to use them (Zaidieh, 2012). However, the introduction of Facebook with interactive advertisements, chatting tools, colourful pages, pictures and games has gained its fame among students and teachers. It encourages students to communicate with their teachers after school hours for their projects and most importantly, Facebook promotes learning through authentic contexts and activities. Students are given leverage to express their thoughts, opinions and suggestions on Facebook. Simultaneously, they will receive comments, feedback and support from their teachers and peers. In this case, strong relationships in the culture of learning for both teachers and students are strengthened (Zaidieh, 2012).

Teachers and students gain the advantages of using Facebook as a tool to allow students to come together to discuss, co-ordinate, collaborate and resolve subject-related problems in the virtual platform (Salaway, Caruso, Nelson & Ellison, 2008). Besides, students using Facebook as an educational tool are encouraged to spend more efforts to work in teams for their academic activities (Kennedy, 2000). With the convenient features in Facebook, students and teachers can experience authentic learning environment when they share the resources, make the announcements, discuss the details of the projects and exchange ideas in groups. As a result, merging Facebook with teaching and learning breaks the four walls of classrooms and provides students more room to interact with the aim at enhancing effective learning. Students are now more able to improvise their thinking and

communication skills which are beneficial to their work in the future. The skills go hand in hand with "engaging students in disciplinary practices of professional practitioners" (Land, Hannafin & Oliver, 2012, p. 11).

METHODOLOGY

AiU has tailored the Community Engagement Projects (CEP) as compulsory curriculum to all the undergraduate students during their 3-year studies. They are from 50 different countries and are expected to be the agents of change to their respective communities after their studies. CEP focuses on empowering underprivileged and disadvantaged students by transferring social entrepreneurship qualities, moving towards a non-conventional paradigm - social business mind set and ability to plan, implement, monitor, identify, scale up and evaluate a "holistic" development programme by taking into consideration social, economic and environmental dimensions.

Indeed, CEP promotes "learning from each other and taking action together" (Chamberlain, 1993, p. 31) in which learning has moved into real social contexts. He further observed that "it is not only what's being done that is impressive, but how – against the odds; and why – the motivation and the spirit that produces such a determination to succeed' in community development (Chamberlain, 1993, p. 32). Ideally, it is linked together with a common goal of combining activities and working together so as to build good relationships and sharing available resources in the communities or villages. It also goes further to encourage the AiU students with community members and other interest groups to be involved in learning by identifying the potential development, making the proposals and action plans based from the demographic findings and monitoring the progress of the development programme at the specified community areas.

A total of 232 undergraduate students had registered themselves in CEP. They were divided into 21 groups. Each group comprised 9 to 13 students. The names of the groups consisted of Enactus 1, Enactus 2, Heptanations, Global SLA and 7-Heaven. Students were able to choose their own group of 3 from different countries. Besides, each student had a Facebook account. AiU had made use of Facebook to make announcements on community service activities and academic matters. Students liked the flexibility of Facebook because it could update the communication in the community fast and also the ability to share multimedia contents. Hence, Dwyer, Hiltz and Passerini (2007) has advocated in the research that Facebook is an easier mean of communication with staff leaders and group members since most undergraduate students are online with Facebook daily.

As part of the preparation process in CEP, Facebook is used as the social media tool for communication. Facebook has become their source of interaction among the project leaders, student group leaders as well as among the group members. They needed to develop their own digital identities in order to become the community of professionals utilizing educational technology to the community. The Year 1 group leader would create a Facebook group at the beginning of the first semester. All group members were required to join the Facebook group. It was not public viewing Facebook groups. Only group members could access and view the groups' announcements, shared documents and online discussions. Figure 1 is an example of a Facebook group created by one of the groups. There were 13 members who came from various countries namely Somaliland, Myanmar, Bangladesh, Sri Lanka, Indonesia, Uzbekistan and Bhutan.

Figure 1: An Example of a Facebook Group

Facebook functioned as a social media tool does support the authentic learning via service-learning. It has also provided information and resources that help students in CEP. By engaging students in Facebook, they were able to flexibly communicate with each other and it was a cost-effective way of communication. Most importantly, Facebook also gave the opportunities to many university students to explore and manage their daily communication in a safe and ethical mode (Ahmedani, 2011).

Purposive samplings also known as random or probability samplings were used in this study. Purposive samplings are a "strategy in which precise settings, persons or events are selected purposely in order to gather important information that can't be obtained from other choices" (Pickard, Child and McLeod, 2007, p. 64). We chose selected CEP groups and they were required to complete 30 items in the Likert-scale survey form. In the survey form, the students were asked about the average time spent on Facebook and whether or not they liked the idea of using Facebook in their CEP.

FINDINGS AND RESULTS ANALYSIS
Out of 232 students, there were only 99 students involved in the survey. They consisted of 51 males and 48 females. Out of 99 students, 83 students used Facebook Group as a communication tool in the CEP. Using Facebook Group triggered the critical discussions and shared field trips experience among the group members. They could also upload and update the common group report to meet the objectives of respective tasks. It goes in line with the objective of this paper which tends to investigate the effectiveness of Authentic Learning Principles and Facebook in promoting active learning among students in their service learning curriculum.
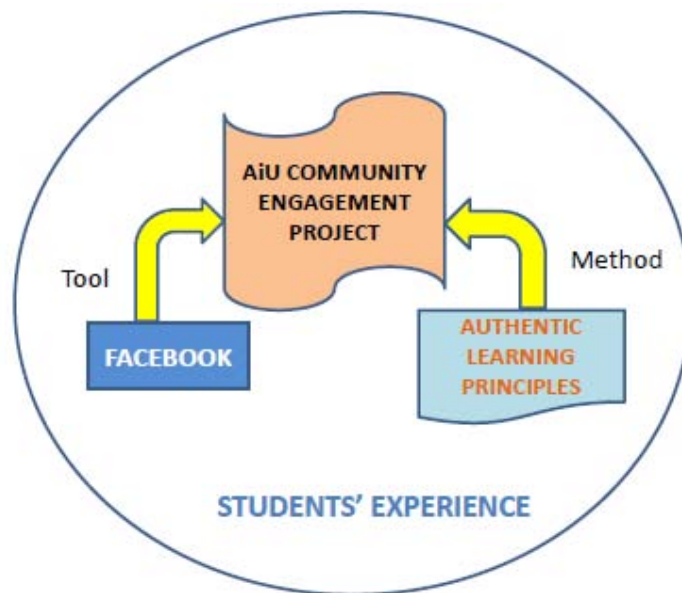
Figure 2: Conceptual framework of CEP in AiU

In this study, we integrated the ten authentic learning principles into the community engagement project activities as indicated in Figure 2. The students went on field trips to study the socio-economic environment of the rural local community. The activities included addressing means of living, strengthening the ability to cope and recovering from stress and shocks, incorporating relevant aspects of people's lives and livelihoods into development planning, implementation and evaluation, and the ability to be responsive to changes and people's needs and ensuring sustainable resources for today and tomorrow's generation.

The outcome of the finding is reflected in the Table 1. Students felt that using Facebook had helped them in achieving a successful outcome in their CEP. The students also agreed that the Facebook group provided a useful medium for them to share and display information and resources. Facebook was as if a noticeboard for any updates of their CEP activities. From this survey, 83% of the respondents had accessed to Facebook all the time and frequently visited the site every day. Only 12% of the respondents were not frequent Facebook users.

Besides, about 90% respondents agreed that Facebook had allowed them to communicate effectively and conveniently between group members and staff group leaders. They could communicate freely in texts for any discussions related to CEP. Facebook had also provided them an easy, cost-effective, safe and friendly environment to voice out their views and opinions.

Almost all the students (93%) agreed that Facebook had promoted authentic learning contexts and activities in CEP by learning the roles, delegating tasks among group members. This was done through Facebook groups and events. Facebook had allowed the students to articulate their views and opinions, discuss issues and process activities via status updates and comments. By uploading the related Youtube, videos and visual elements to Facebook, the experts of performance were able to identify how service learning was conducted as well as to explore more topics through external links.

Two thirds of respondents (66%) agreed that coaching and scaffolding were done through Facebook discussions and it had given the opportunity to instructors to observe the activities and comments made by the students. When students had made a comment or asked for a question, feedback could be given by the project leader or the group leader. Somehow, only 70% of the students agreed that the feedback had helped the students to reflect on what they had learnt during the CEP activities. The overall result of this study had implied that Facebook was a social media tool that could be used as platform to implement authentic learning principles in AiU CEP activities.

DISCUSSIONS

There were some limitations in this study. Firstly, Four groups had not adopted Facebook as a social network media tool in the CEP. The students felt that Facebook was merely for their social lives and it was not for academic activities. Some students found that the staff leaders did not extend their co-operation in assisting them to complete their activities and tasks related to CEP. It had affected the results for the principle in coaching and scaffolding. Secondly, Facebook had a constraint of only accepting a certain type or format of document to be uploaded. Thus, it restricted the students and project leaders to share the resources among the group members. Finally, students appreciated very much the flexibility of Facebook in terms of communication and sharing information and resources. Facebook has already been an integral part of undergraduate students' daily lives. Students could improve better through their CEP with the integration of Facebook as a social media tool and ten authentic learning principles. Hence, the study has shown that students favourably responded well to this framework.

Table 1: The Students' Perceptions on Facebook and Authentic Learning Principles

Authentic Learning Principles	N	Mean	Std Dev
Principle 1: Authentic Context	99		
a. Facebook allows you to bring the real life learning experience into community engagement activities.		2.4693	0.7587
b. Facebook provides you a place to display pictures, YouTube or visual elements about community engagement activities.		3.0202	0.7518
c. Facebook is a tool to motivate you to learn more about the community engagement activities during the process.		2.4141	0.8042
Principle 2: Authentic Activities	99		
a. Facebook provides you a place to determine the roles of each team members in the community engagement activities.		2.616	0.7876
b. Facebook provides you a place to delegate the tasks of community engagement activities among the team members.		2.889	0.7899
c. Facebook provides you a place to connect with team members regardless of their locations about the community engagement activities easily.		3.071	0.7726
Principle 3: Expert Performance	99		
a. Facebook provides a place to project leaders to demonstrate the steps to begin and manage community engagement activities systematically.		2.745	0.7601
b. Facebook provides you a place to observe the communication skills of the project leaders to other students.		2.633	0.8130
c. Facebook allows easy and cost-effective communications among team members and project leaders.		3.072	0.7766
Principle 4: Multiple Roles and Perspectives	99		
a. Facebook provides you a place for different comments and opinions about		2.990	0.7491

community engagement activities.			
b. Facebook provides you a place to investigate the reliability of information about community engagement activities.		2.663	0.8800
c. Facebook provides you a place to update your group members about any news and discussions on community engagement activities.		3.265	0.6784
Principle 5: Reflection			
a. Facebook provides you a place to write reflections about your strengths and weaknesses in community engagement activities.	99	2.459	0.8227
b. Facebook provides you a place to record the incidents take place throughout the community engagement activities.		2.633	0.8498
c. Facebook is a place to express your feelings freely without being judged.		2.691	0.9235
Principle 6: Collaboration			
a. Facebook provides you to collaborate among members of the community engagement group.		2.857	0.6999
b. Facebook provides you as a medium to collaborate their work and ideas about community engagement activities.	99	2.888	0.6528
c. Facebook allows you to share the group reports about community engagement activities.		3.010	0.6308
Principle 7: Articulation			
a. Facebook provides you to discuss issues or processes of community engagement activities.		2.816	0.7333
b. Facebook provides you the opportunity to debate about the views on community engagement activities.	99	2.724	0.8053
c. Facebook is a tool to adopt a new learning method in community engagement activities.		2.546	0.8618
Principle 8: Coaching and Scaffolding			
a. Facebook provides project leaders to observe students, offering resources and providing feedback about community engagement activities.		2.691	0.7231
b. Facebook provides the opportunity to you on the skills and knowledge transfer from project leaders about community engagement activities.	99	2.670	0.7828
c. Facebook provides you an effective channel for the project leader's feedback and areas of improvements about community engagement activities.		2.753	0.6740
Principle 9: Integrated Authentic Assessment			
a. Facebook can capture rich information about student performance in community engagement activities.		2.408	0.8186
b. Facebook allows you to upload reports about community engagement activities for project leader's assessment.	99	2.867	0.7645
c. Facebook has the mechanism for you to continuously revise your reports based on project leaders' feedback about community engagement activities.		2.732	0.7253
Principle 10: Professional Learning			
a. Facebook allows students to keep informed about new technology developments in teaching and learning techniques related to community engagement activities.		2.816	0.6903
b. Facebook allows student to update information relevant to their future professional development.	99	2.847	0.7050
c. Facebook is a social media tool to learn about community engagement project in innovative, challenging and creative ways.		2.714	0.8081

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UNDERSTANDING INFORMATION SEEKING BEHAVIOR IN TECHNOLOGY PERVASIVE LEARNING ENVIRONMENTS OF THE 21ST CENTURY

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ABSTRACT
This research reports findings from a study on information behavior to indicate educationally relevant activity, such as information seeking and sharing, in technology pervasive information environments of the 21st century. Adult learners who are social media users (n = 147) completed an online learning preference survey battery that included the Social Media Learning scale, the Technology Affinity Survey, the Computer Attitude Questionnaire, and the Information and Communications Technology Learning survey. Findings revealed that 23% of the variance in information seeking behavior for this sample was explained by a multiple linear regression model, based on reported perceptions of creative tendencies, attitude towards school, learning with social media, and degree of daily technology use/immersion. Participants with higher preference for information seeking were found to have more positive attitudes toward school, a stronger sense of having creative tendencies, and a higher preference for learning with social media while they also had a lower preferences for continuous immersion in digital communications. Implications of these findings and future research directions are discussed.
Keywords: social media tools, guided inquiry, information seeking, instruments

INTRODUCTION
Information and communications technology (ICT) are coming of age to play a central, commonplace role in formal and informal learning. Educators and learning technologists are interested in understanding how new ICT tools, such as social media will be used by students. Of particular interest is the role of ICT in the information inquiry process used by students to seek information, collaborate, and also to communicate thoughts and content. While Web 2.0 technologies provide a wide array of ICT tools that can be applied to information seeking for knowledge construction, immediate access to a wide array of digital content will not necessarily result in the use of ICT and social media tools for educationally relevant learning activities. The popularity of social media tools and the great interest in their potential for use in education prompted this research, which examines the attitudes and preferences of students in higher education towards learning ICT. Survey data were gathered from using an online survey battery that included four instruments: the *Social Media Learning* (SML) scale, the *Technology Affinity Survey* (TAS), the *Computer Attitude Questionnaire* (CAQ), and the *Information and Communications Technology Learning* (ICTL) survey, for a research study designed to examine learner preferences for technology in order to better understand how ICT/social media tools are used by individual students. This article reports findings regarding student preferences that may align with information behavior supporting learning activities, such as information seeking and sharing, that are associated with educationally relevant activities that can support knowledge construction.

CONCEPTUAL RATIONAL
LEARNIING WITH TECHNOLOGY
Technology tools are recognized for their ability to provide unique opportunities for cognitive development and to enhance the capabilities of those who wield the tools (Bruner, 1964). Bruner theorized that, over time, humanity has developed specialized capabilities more by connecting to new, external implementation systems (Bruner, 1964), than by any physical changes in being. We see evidence for Bruner's theories today as ICT tools and technology-pervasive Internet environments elevate individual information seeking and sharing capabilities to new heights. Renowned technology expert, computer scientist, and educator Seymour Papert also envisioned computer technology in a transformative role that would augment student capabilities. Papert and Harel (1991) predicted that a new kind of system for education, one comprised of a student and a computer, would allow a leaner to utilize computer technology to create a powerful force for change that would result in improvement of student learning (Papert & Harel, 1991).

THE INFORMATION SEARCH PROCESS
Kuhlthau (1991, 2007) conducted research on student activities for affective, cognitive, and physical dimensions of information behaviour in the traditional library setting and also in technology-rich online environments. The Information Search Process (ISP) Model, devised by Kuhlthau, depicts six stages of student information

activity: initiation, selection, exploration, formulation, collection, and presentation. Together these six stages can help explain student information behaviour and also allow educators to guide students in search activities (Kuhlthau, 1991). Kuhltau's (2007) research, an updated review of the literature and extensive inquiry project among n = 574 students, indicated that the ISP model for dimensions of information behaviour continues to be useful in explaining the search process in the digital and technology-pervasive information environment of the Web 2.0 world (Kuhlthau, 2007; Kuhlthau, Heinström, & Todd, 2008). Validation of Kuhlthau's (1991) ISP model for student information behaviour in technology-rich environments provides direction for instruction designed to guide student inquiry (Kuhlthau, Maniotes, & Caspari, 2007) beyond the traditional library to the Internet realm of digital information. Viewed as an instructional model, guided inquiry can direct students' information behavior to educationally meaningful activities that will support knowledge construction. One approach to guided inquiry focuses on a teacher and curriculum connection to each individual student's learning environment. Maniotes (2005) conceptualized three spaces that are important for teaching and learning—the first space, the students' current experience and knowledge; the second space, the curriculum; and the third space, the students' learning environment. Maniotes' model is based on the premise that educational social interaction and intellectual discourse in the students' third space can interconnect a student's experience and knowledge with curriculum (Kuhlthau, Maniotes, & Caspari, 2007). ICT, especially social media communications tools, offer new options to support student learning interaction and guide student information behavior in digital information settings of the 21st century. The third space for curriculum-driven intellectual communication employs ICT to advance learning interactions via social dimensions of student-teacher systems of communications.

THE SOCIAL DIMENSIONS OF LEARNING

John Dewey, father of Deweyan social epistemology and constructivism, recognized nearly 100 years ago that knowledge cannot be passed along from person to person—teacher to learner—in the manner of physical objects (Dewey, 1985). He theorized the social dimensions of sharing knowledge and considered social arrangements and sharing as educative to those who participate in communications, which he considered the central action in education (Dewey, 1985). Sharples (2005) identified a need for a new conceptual framework that recognizes the essential role of communication for learning in the mobile age. Communications and the transformative effect of digital networks for communication provide a new venue for discourse and negotiation of agreements among differing perspectives within the context of established meaning (Sharples, 2005). Vygotsky's Theory of Social Development recognized social interaction as a precursor to development, consciousness, and cognition in a progressive cognitive growth model where each function appeared in two forms: initially on a social level, and subsequently on an individual level (Vygotsky, 1962, 1978). Tharp and Gallimore (1988) developed a foundation for schooling and social interaction based on concepts from the work of social scientists in the neo-Vygotskian contexutalist and interactionist schools of thought. Scholars aligned with this framework believe that teaching, learning, and schooling can best be understood in a social context (Tharp & Gallimore, 1988) and that higher order cognitive functions develop from social interactions (Bruner, 1962).

THE STUDY
RESEARCH DESIGN

This quantitative research study is based on a pre-experimental one-shot case study design where the sample is examined for overall preferences as one group and also as two parts of the whole. Whole group trends are analyzed as well as comparison of the group divided by median response ratings as two groups, one high (above the median score) the other being low (below the median score), in attitude towards learning with information communications technology.

RESEARCH QUESTIONS

1. Does a students' attitude towards use of social media tools in educational contexts relate to student information behavior for seeking or sharing digital information?
2. Does daily technology use (affinity for technology and tendency to be immersed in technology) relate to students' information behavior for seeking or sharing digital information?
3. Are student learner dispositions such as attitude towards school, perceptions of being creative, or feeling motivated related to preference for use of ICT information seeking or to daily technology use/affinity?

DATA COLLECTION

Subjects were volunteer, higher education, social media users at least 18 years of age who responded to email and Facebook invitations to complete an online learning preference survey battery. The survey battery included a number of instruments to include the four instruments discussed in this study: the Information and Communications Technology Learning survey, the Social Media Learning scale, the Technology Affinity Survey, and the Computer Attitude Questionnaire. This survey battery circulated by graduate students enrolled

in a north Texas (USA) higher education learning technologies program as part of a study designed to study participants' use of ICT tools, preferences for daily technology, and attitudes towards learning with technology such as social media tools. One hundred forty-seven (n = 147) subjects completed the survey during the spring semester of 2012. Subjects were 76% women (n = 112) and 24% men (n = 35) (Table 1), spanning 18 to 60+ years of age (Table 2). Subjects represent a wide group of adult social media users connected by communications technologies.

Table 1: Descriptive statistics: study subjects by gender.

Gender	Frequency	Percent
Male	35	23.8
Female	112	76.2
Total	147	100.0

Table 2: Descriptive statistics: study subjects by age.

Age in years	Frequency	Percent
18-20	37	25.2
21-30	38	25.9
31-40	16	10.9
41-50	17	11.6
51-60	28	19.0
61+	11	7.5
Total	147	100.0

INSTRUMENTS

Survey data were gathered from participants who completed an online survey battery that included four instruments: the Social Media Learning (SML) scale, the Technology Affinity Survey (TAS), the Computer Attitude Questionnaire (CAQ), and the Information and Communications Technology Learning (ICTL) survey. Responses to the question items from these instruments are Likert-type that range from 1 to 5, where 1 = strongly disagree and 5 = strongly agree. Cronbach's alpha internal consistency reliabilities for instrument scales were analysed and interpreted by DeVellis' (1991) guidelines (Table 3).

Table 3: Cronbach's Alpha internal consistency reliabilities for instrument scales.

Scale	Number of items	Item numbers	Alpha	Rating by DeVellis
CAQ: Creative Tendency	13	1-13	.78	Respectable
CAQ: Attitudes toward School	7	1-7 (2r,5r)	.81	Very Good
ICTL Total Scale	15	1-15	.77	Respectable
ICTL: Info Seeking	7	1,4,7,8,10,13,14	.71	Respectable
ICTL: Info Sharing	8	2,3,5,6,9,11,12,15	.83	Very Good
SML Total Scale	7	1-7	.74	Respectable
TAS Total Scale	22	1-22	.74	Respectable
TAS: Immersed	13	7,10,9,8,13,12,3,21,22,11,4,16,19,5	.78	Respectable
TAS: AlwaysOn	4	18r,5r,2r,1r,6	.55	Unacceptable

The Creative Tendencies and Attitude towards School subscales of the CAQ were used to gauge participant perceptions of creativity and attitude towards school. The CAQ measures dimensions of student attitudes towards learning and computers. This questionnaire was developed from another instrument, the Young Children's Computer Inventory (YCCI) and has foundations in research funded by the Fulbright Foundation of Washington, D.C., the Japan Society for the Promotion of Science, and the Texas Center for Educational Technology at the University of North Texas. The CAQ was formalized as a validated measurement tool in 1995 and has been extensively used in research studies (Knezek & Christensen, 1995, 2000) before being released for public use in 2000. The instrument was revalidated for use in secondary grades in 2011 (Mills, Wakefield, Najmi, Surface, Christensen, & Knezek, 2011). Internal consistency reliability for the CAQ Creative Tendency subscale (α = .78) and the Student Attitudes toward School subscale (α = .81) for the 147 subjects in the current study were found to be respectable and very good, respectively (DeVellis, 1991).

The Information and Communications Technology Learning survey was designed and refined in a doctoral level course on psychometric measurement and was expanded and validated in a 2011 study of student ICT tool use (Mills & Knezek, 2012) (Figure 1). The ICTL was developed for research on how students choose to interact with ICT tools in digital information environments. The refinement process, which included higher-order factor analysis, revealed two reliable measurement scales: Information Seeking (α = .71) and Information Sharing (α = .83) with respectable and very good measurement properties, respectively (DeVellis, 1991).

Information and Communications Technology Learning (ICTL)
1. I would like to be a participating member of an online community.
2. I use Internet technology to explore topics of interest.
3. I like to share interests and reflections online.
4. I like to enroll in classes to continue my education.
5. I use Internet communications and other technology tools for self-expression.
6. I learn many things by interacting with other Internet users.
7. I like to take classes from good professors.
8. I use Internet communications technology tools when I want to learn about something new.
9. I learn best in a traditional classroom setting.
10. Internet technology helps me be successful in my college classes.
11. More classroom learning should include interactive communication technology experiences.
12. The things I need to know are taught by instructors in the classroom.
13. I learn more when I regulate my own learning experience and seek information on things that I want to learn about.
14. I use Internet communications technology to keep current on topics related to my field of expertise.
15. I post information that might be of interest to other people.

Figure 1. The Information and Communications Technology (TAS) survey items.
Note: ICTL V1.0 by Mills, L. & G. Knezek, (2011)

The Social Media Learning scale was originally developed to measure student perceptions of Twitter for student reflections and community building in university courses featuring Global Policy and Digital Textuality. Subsequently the SML instrument was analyzed (Knezek, Mills, Wakefield, 2012) and refined by college faculty and learning technologies graduate students as the Social Media Learning (SML) scale (Figure 2). The refinement process revealed that this unidimensional (single factor) instrument has respectable (Devellis, 1991) internal consistency reliability (α= .74).

Social Media Learning (SML). When using social media…..
1. I feel a sense of community learning becomes interactive.
2. Posting questions to my peers helps me understand my readings better.
3. I am able to get faster feedback from my peers.
4. I am able to get faster feedback from my instructor.
5. I am able to communicate effectively.
6. I am able to connect with peers more easily than face-to-face.
7. I increase my participation in classes when I am allowed to contribute through social media.

Figure 2. Social Media Learning (SML) scale items.
Note: SML V.1. By Alsobrook, M., Knezek, G., Wakefield, J., (2011).

The Technology Affinity Scale was developed during a doctoral-level psychometrics class offered at a university in North Texas during the summer of 2011 (Figure 3). This instrument was inspired by the need for a reliable instrument to measure Internet-related digital technology use—affinity for technology and immersive technology use—with a focus on mobile technology tools. TAS produced high internal consistency reliability values as a total scale score (22 items) for the   n= 147 subjects in this study and is currently being further refined to determine eventual retention of measurement subscales. Two emerging subscales from TAS were used in this study: the first gauges tendency to be preoccupied with or immersed in technology-based interaction, and the second indicates a preference for continuous connection to (always-on) communications. These subscales were identified and based on their factor analytic construct validity. They are of interest in the current study because they lend insight into the extent and uses of daily communications technology. Internal

consistency reliabilities for TAS subscales: TAS immersed, α= .77, and TAS always-on, α= .55, would be considered, respectively, respectable and unacceptable by Devellis' (1991) guidelines.

Technology Affinity Scale (TAS)
1. It is impolite to work on a computer in the audience during a presentation.
2. There are certain events during which ALL electronic devices should put away.
3. My attention is often distracted by email or test messages when I am talking to someone.
4. I communicate with my friends mostly by text message.
5. Some people are too absorbed in electronic communications to really listen face to face.
6. It's okay to send text messages while carrying on a face to face conversation.
7. I often type text messages while walking down the street.
8. I sometimes check text messages while driving.
9. I sometimes check email messages during meetings.
10. I feel agitated when I am away from the Internet for more than a day.
11. I feel disturbed if I go out and forget my cell phone.
12. I prefer to socialize on social media rather than face to face.
13. Many relationships are easier to maintain on Facebook-type social media.
14. I would use an online dating service.
15. I would not use the Internet to find a babysitter.
16. My computer is just as important to me as my wallet or purse.
17. For me, a computer is a better companion than a pet.
18. Many people are too attached to their smart phones.
19. Many people have good friends they met via social networks.
20. Getting married via computer connection is taking the Internet a bit too far.
21. Sometimes I feel more available to my electronic devices than to my family.
22. I sometimes feel I am a slave to the technologies that surround me.

Figure 3. Technology Affinity Scale (TAS) items

FINDINGS

Research Question #1 was examined with Pearson's product moment correlation analysis between participant preferences for use of social media tools, as gauged by the SML scale, and information behavior for seeking and sharing information, as gauged by ICTL seeking and sharing subscales. A significant relationship was identified between attitude towards social media learning and information seeking, $r = .338$, $p < .0005$; and also between social media learning and information sharing, $r = .580$, $p < .0005$. These positive correlations explain 11% and 37%, respectively, of the variance associated with attitude to use of social media for learning and information seeking and sharing.

Research Question #2 was investigated with Pearson's product moment correlation analysis between degree of technology affinity, as gauged by the TAS total score and the TAS_immersed subscale, and tendency toward seeking or sharing digital information, as gauged by ICTL seeking and sharing subscales. A significant correlation was identified between overall technology affinity and information sharing, $r = .402$, $p < .0005$. Significant correlation was also found between tendency to be immersed in daily technology and information sharing, $r = .386$, $p < .0005$. These positive correlations explain 16% and 15%, respectively, of the variance associated sharing digital information and technology affinity and immersion.

Research Question #3 was also examined by analysis of Pearson's product moment correlation analysis in order to examine possible relationships between ICTL seeking information and CAQ learner disposition subscales for attitude towards school, creative tendencies, and motivation. Information seeking was found to be significantly and positively correlated with learning with CAQ creative tendencies ($r = .25$, $p < .002$), and CAQ attitude towards school ($r = .20$, $p < .017$). These positive correlations explain 6% and 4%, respectively, of the variance associated with seeking digital information attitude towards school and creative tendencies. Perception of being motivated was found to be positively correlated with perceptions of having creative tendencies ($r = .411$, $p < .0005$), and negatively correlated with being TAS immersed in daily technology use ($r = -.192$, $p = .020$). These correlations explain 17% and 4%, respectively, of the variance associated with perceptions of being motivated, having creative tendencies, and being immersed in use of communications technologies.

Additionally, analysis of variance for low versus high preference for ICT learning scale scores was conducted in order to determine if differences would exist between overall attitude towards learning with ICT on the ICTL

and other learning preferences examined in this study via the SML, TAS, and CAQ. Low and high ICTL groups were created by dividing participants into two groups based on the median ICTL total score of 3.69 across the range of 1 to 5 for the n = 147 survey participants. Respondents with mean ratings below the median were designated as the low group on preference for ICT learning, while those with mean ratings above the median were designated as being the high group on the ICT learning preference spectrum. Significant variance between the two groups was found for attitudes toward social media learning (SML), technology affinity (TAS), and creative tendencies (CAQ). Students in the high ICTL group disposition were found to have a more positive disposition for learning with social media, higher technology immersion, and higher perceptions of having creative tendencies. Effect sizes for these significant variances were in the large ($r = .8$) to medium ($r = .5$) range according to guidelines by Cohen (1988), Table 4.

Table 4. Significant variance for ICTL total scale score high and low groups.

Analysis of Variance For High/Low Group: ICTL Information Seeking						
	N	Low Group	N	High Group	Sig.	Cohen's D Effect Size
SML	75	3.10	72	3.46	0.000	.86
TAS: Always-On	75	2.87	72	1.75	0.001	.56
CAQ Creative Tendencies	75	3.77	72	3.95	0.002	.51

Understanding and identifying information seeking behavior for inquiry was of particular interest in this research. The question items that make up the ICTL seeking information subscale align with constructivist information behaviors indicative of interaction with information and content for information seeking and could be considered educationally relevant to knowledge construction. The median value for information seeking (TAS) for n = 147 participants was 4.2 out of a possible 5. Significant variance between low and high disposition for seeking information with ICT was found for learning with social media (SML), technology affinity for always-on digital communications (TAS), CAQ attitudes towards school, and creative tendencies. Participants higher in disposition towards ICTL information seeking were found to have more positive attitudes towards learning with social media. They also had more a positive attitude toward school and felt more creative as learners. Additionally, the group found to be high in information seeking also had a lower preference for continuous (always-on) connection to digital communications technology (TAS). These effect sizes (Table 5) are considered to be in the small ($r = .3$) range according to guidelines by Cohen (1988), and yet they are also of sufficient magnitude to be considered educationally meaningful (Neuman, Bialo & Sivin-Kachala, 1996).

Table 5. Analysis of Variance for ICTL: Information Seeking high and low groups.

Analysis of Variance For High/Low Group: ICTL Information Seeking						
	N	Low Group	N	High Group	Sig.	Cohen's D Effect Size
SML	73	3.24	74	3.46	0.022	0.37
TAS: Always-On	73	1.93	74	1.75	0.052	0.33
CAQ Attitudes Toward School	73	3.46	74	3.7	0.046	0.32
CAQ Creative Tendencies	73	3.82	74	3.95	0.066	0.29

Multiple linear regression analysis was conducted to determine the extent to which a model based on significant factors for disposition to information seeking can predict information seeking behavior. As shown in Figure 4, ICTL information seeking behavior as a function of multiple linear regression for factors representing 1) learning with social media, 2) technology affinity for always-on communications connections, 2) learner attitude towards school, and 3) learner perceptions of having creative tendency accounted for 23%, RSQ=.226, of the variance in ICTL information seeking behavior with model significance at $p < .0005$. The standardized

regression coefficients Beta weights from Figure 4 indicate that preference for learning with social media (Beta = .364, p < .0005), and CAQ attitudes towards school (Beta = .269, p = .003) contribute most significantly to this regression model for prediction of information seeking behavior.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.476[a]	.226	.205	.4884

a. Predictors: (Constant), smed_t, TAS_alwaysOn, creat_t, ats_t

Coefficients[a]

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.914	.451		4.243	.000
	TAS_alwaysOn	-.150	.073	-.152	-2.045	.043
	ats_t	.170	.057	.229	3.000	.003
	creat_t	.190	.093	.156	2.044	.043
	smed_t	.335	.070	.364	4.772	.000

a. Dependent Variable: ictl_seeking

Figure 4. Model summary and standardized beta coefficients output for the ICTL information seeking multiple linear regression model.

DISCUSSION

While there is a large body of research to indicate that appropriate application of information technology can enhance student learning (Voogt and Knezek, 2008), the promise of personal computers as tools with power to support new systems of connection between learners, instructors, and digital information for learning interaction and knowledge construction has yet to be fulfilled (Halverson & Smith, 2009). Technology-pervasive information environments offer unique affordances for educational discourse and information-seeking behavior that is associated with social and cognitive development for inquiry and knowledge acquisition. Yet as an increasing number of daily activities and educational offerings are transferred to the online realm, educators have only begun to utilize the potential of systems connecting student, technology, and teacher for direct inquiry and guided instruction for educationally relevant interaction with digital information. Some educators worry that the instruction in schools of today has changed very little in recent decades (Cuban, 2001) and that the ICT-driven change that has taken place is classrooms is not in the direction of innovation in learning and augmentation of learner capabilities as proposed by early visionaries (Halverson & Smith, 2009) but that instead technology in schools is most often being employed for content delivery, assessment, and reporting.

CONCLUSION

This research reports findings for a study of information behavior for seeking and sharing information in technology-pervasive 21st century information environments. Social media users (n = 147) completed an online learning preference survey battery that was designed to allow exploratory research on student preferences for use of technology for learning in technology-pervasive, Internet environments. The survey battery included three recently validated instruments for evaluation of student attitudes towards learning with information communications technology tools (ICTL), learning with social media (SML), and daily technology use and affinity (TAS), along with a well-established instrument that has been used in many studies related to student learning with computers (CAQ). Research questions examined factors that can be used to identify student information seeking and sharing activities. Information seeking was more closely examined as being indicative of inquiry for knowledge construction. Findings indicate that ICT preference for seeking and sharing digital information is positively associated with a positive attitude towards using social media for learning (SML), with the strongest alignment between ICTL sharing information and social media learning. Technology use and affinity data revealed a positive trend between preference for daily technology use and ICTL information sharing. Being TAS immersed in daily technology use was also positively associated with ICTL information sharing.

Examination of participant preference for seeking information and for possible predictors of ICTL information seeking behavior revealed associations between tendency to seek information with positive student attitude towards school and perceptions of having creative tendencies. Additionally, participants who were above the median for ICTL information seeking were found to have lower mean scores for TAS continuous (always-on) connection to communications technologies, while having higher mean scores for learning with social media.

Additional research is planned to identify instructional design components that will support opportunities for both information seeking and sharing.

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APPENDIX

I Part 1 Computer Attitudes (Comfort, Learning)
1. I enjoy doing things on a computer. (1)
2. I will be able to get a good job if I learn how to use a computer.(3)
3. I would work harder if I could use computers more often.(6)
4. I know that computers give me opportunities to learn many new things.(8)
5. I can learn many things when I use a computer.(9)
6. I enjoy lessons on the computer.(10)
7. I believe that the more often teachers use computers, the more I will enjoy school.(11)
8. I believe that it is very important for me to learn how to use a computer.(12)
9. I get a sinking feeling when I think of trying to use a computer.(16)
10. I think that it takes a long time to finish when I use a computer.(7)
11. Working with a computer makes me nervous.(17)
12. Using a computer is very frustrating.(18)
13. I will do as little work with computers as possible.(19)
14. Computers are difficult to use.(20)
II Part 3 Empathy
15. I feel sad when I see a child crying.(716)
16. I sometimes cry when I see a sad play or movie.(717)
17. I get angry when I see a friend who is treated badly.(718)
18. I feel sad when I see old people alone.(719)
19. I worry when I see a sad friend.(720)
20. I feel very happy when I listen to a song I like.(721)
21. I do not like to see a child play alone, without a friend.(721)
22. I feel sad when I see an animal hurt.(722)
23. I feel happy when I see a friend smiling.(723)
24. I am glad to do work that helps others.(724)
III Part 4 Creative Tendencies
25. I examine unusual things. (726)
26. I find new things to play with or to study, without any help. (727)
27. When I think of a new thing, I apply what I have learned before. (728)
28. I tend to consider various ways of thinking. (729)
29. I create many unique things. (730)
30. I do things by myself without depending upon others.
31. I find different kinds of materials when the ones I have do not work or are not enough. (732)
32. I examine unknown issues to try to understand them. (733)
33. I make a plan before I start to solve a problem. (734)
34. I invent games and play them with friends. (735)
35. I invent new methods when one way does not work. (736)
36. I choose my own way without imitating methods of others. (737)
37. I tend to think about the future. (755)
IV Part 5 Attitude Toward School
38. I really like school. (739)
39. School is boring. (740)
40. I would like to work in a school when I grow up. (741
41. When I grow up I would not like to work in a school. (742)
42. I am learning a lot in school. (743)
43. My friends from other schools would like to go to this school. (744)

Source: Computer Attitude Questionnaire CAQ NSF ITEST v. 7.1 by G. Knezek & R. Christensen (2010)

USING TWITTER AS AN INSTRUCTIONAL TOOL: A CASE STUDY IN HIGHER EDUCATION

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ABSTRACT
The implementation of Web 2.0 technologies and related research studies are in their early stages. Therefore, this study addresses the utilization of the most commonly used microblogging website, Twitter, in a higher education course. Study participants (n = 48) filled out a quantitative survey before, during, and after participating in a course that utilized Twitter as an instructional tool. At the end of the course, the participants responded to eight open-ended questions about the process and idea of using Twitter. The study result showed that the participants increased their uses of Twitter for learning purposes. The participants' ideas of using Twitter as a teaching or learning tool progressed during the course. They also remarked about the possible negative effects of Twitter in instruction.
Keywords: microblogging, Twitter, Web 2.0, higher education, teaching, learning

INTRODUCTION
Web 2.0 technologies have infused daily life and spread through many organizations, including educational institutions. However, educators are still not sure how these technologies will affect their students or how students perceive these technologies within an instructional framework (Caruso & Salaway, 2008). Due to rapid developments in information and communication technologies, Web 2.0 tools such as blogs, wikis, photo and video sharing sites, and social networking forums have grown quickly all across the Internet. Microblogging sites such as Twitter are particularly popular around the world. People from different countries and socio-economic backgrounds connect to Twitter to interact, and new mobile technologies are constantly being adapted, making Twitter a common part of daily activities. This article concentrates on the use of Twitter as an instructional tool in a higher education course. The researchers designed a case study using a course in which Twitter was implemented and documented changes in students' ideas about Twitter over time.

Theoretical Background
Web 2.0 Technologies
Although many countries have put a significant effort into adapting educational institutions to technological innovations, some countries still likely undervalue the significance of these innovations (OECD, 2010). Additionally, "we still have a long way to go in understanding methods of effective practice" (Greenhow, 2009, p. 10) with regard to technologies. From their initial appearance, Web 2.0 tools have been highly developed. Their natural potential is reflected in education as well. For example, Web 2.0 technologies facilitate online learning by increasing interactivity, active participation, and feedback mechanisms (Harrison & Thomas, 2009).

Tim O'Reilly first introduced the concept of Web 2.0 in 2005. He has emphasized that Web 2.0 technologies are more oriented to participation by indexing information in the form of tags. Likewise, Web 2.0 technologies can be characterized as controlling the web through participation with respect to the construction and distribution of information (Siemens & Tittenberger, 2009). Furthermore, they provide a shift in focusing on information practical to people, facilitating interaction. Selection of information is as important for users as its collaborative creation (Todd, 2008).

Web 2.0 technologies have played a role in the establishment of many online communities. For instance, Flickr, Facebook, and Delicious have guided the development of large-scale groups that address a variety of technological contexts, interests, and cultural backgrounds. Using Web 2.0 technologies, these communities create their own regulations and cultures (Drula, 2009). These technologies have also blurred the borders between publicity and privacy, altering existing relationships. Therefore, the learning process must be re-defined accordingly, no longer bound by time and place but a lifelong journey (Huijser, 2008). In comparison to traditional web technologies, Web 2.0 caters to more personal needs of users. In that sense, Web 2.0 technologies lead to more collaboration than previous tools (Fu, Liu, & Wang, 2008), facilitating self-

expression, communication, and interaction via the Internet (Office of Communications, 2008). Furthermore, Web 2.0 tools allow people to access information quickly over the Internet via established friendships (Thelwall, 2008).

Higher education systems are in the process of transforming their fundamental structures (Siemens & Tittenberger, 2009). The importance of lifelong learning has been perceived as an essential instructional approach, so the central role of new technologies, including Web 2.0 tools, has caught the attention of shareholders (Friedman & Friedman, 2008). Potential uses of these technologies must be analyzed by current researchers and designers in terms of their new roles in education (Owen & Moyle, 2008). Educators must decide how to deal with Web 2.0 innovations: abandon them, support them, or control them (Huijser, 2008). Ignorance of these technologies will cause many disadvantages going forward. Understanding and predicting human behavior is extraordinarily complicated; however, conducting scientific studies is more useful than guesswork (Severin & Tankard, 1997). Therefore, more research studies of Web 2.0 technologies must be conducted for a better understanding of their use in education and what steps should be taken next.

Harris and Rea (2009) have summarized the advantages and disadvantages of utilizing Web 2.0 in an educational context. With these tools, (a) students become active elements in the instruction process, (b) the borders of classrooms extend outwards to include the entire world, (c) cooperative learning occurs, and (d) students can access knowledge whenever they want. These tools also bring some challenges to classrooms: (a) learning becomes highly dependent on computers and related technologies, (b) web resources are exposed to potential abuse by bullies, (c) plagiarism could occur, and (d) the publicity of students' work could create a certain level of discomfort.

Twitter as a Microblogging Website
Microblogging websites allow members to post 140-character messages to the public. Once a user registers on a microblogging website such as Twitter, other users can follow him or her; whatever is shared is generally visible to all users. Mobile technologies for microblogging applications have increased the use of Twitter. Kaplan and Haenlein (2011) stated that microblogs have already taken their place among Web 2.0 technologies, but it is strange that microbloggers like an application with strict character limitations. They propose three possible reasons for its popularity: (a) microblogging sites keep users updated about what is going on around them, (b) they allow users to read and share messages publically with greater ease than private social networking sites, and (c) they allow for both online exhibitionism and voyeurism for active microbloggers and passive readers.

Established in 2006, Twitter has become one of the most popular microblogging websites in the world. Bozarth (2010) defines Twitter as "email 2.0" (p. 25). A user can send a 140-character message (a tweet), forward other users' tweets (retweet), mark other users' tweets with the @ sign (tag), reply to tweets, send direct and private messages to other users, create lists of users, and publicly identify usernames in tweets by including the @ sign (mentions). Chen (2011) conducted a uses and gratification study of Twitter and concluded that as Twitter members spend more time there, they become addicted and feel more satisfied with its features. She also pointed out that Twitter helps people fulfill a basic human need: communicating with other people.

Instructional Use of Twitter
Twitter also offers many opportunities for researchers. Ovadia (2009) has specified that since Twitter maintains tweets in chronological order, it offers a great platform for designing and conducting academic studies, especially in social and behavioral sciences. As Fox and Varadarajan (2011) observed, research opportunities on the use of Twitter for educational purposes are still emerging. Most research has been conducted on Twitter in K-12 settings; thus, more studies should focus on its instructional use in higher education.

Researchers and educators have tried to investigate the integration of Twitter into the learning process by forming a community or orchestrating activities in class (Galagan, 2009). Junco, Helbergert, and Loken (2011), for example, used Twitter in a first year seminar for 125 pre-health professional majors to investigate the effects of Twitter. They concluded that Twitter has the potential to increase engagement and mobilizes students to actively participate when used as a part of the learning process. There was also an apparent increase in the grades of the experimental groups. Twitter adds educational value while generating social networks between instructors and students, yielding alternative ways to participate and communicate (Minocha, Schroeder, & Schneider, 2010).

In another study on using Twitter to enhance social presence in online instructional design and technology courses, several benefits were determined: (a) it provides quick help for students' issues, (b) it develops students' writing skills, (c) it helps them gain respect from their followers, (d) it yields participation to a

community of practice, (e) it generates informal learning activities via self-directed and independent learning, and (f) it allows for on-going relationships even after the course ends (Dunlap and Lowenthal, 2009). Besides instructional benefits, possible drawbacks of Twitter should also be taken into consideration by using it in instructional situations.

Fox and Varadarajan (2011) used Twitter in a multi-campus pharmacy management course to understand the positive and negative aspects of the microblogging as well as its effectiveness among students in terms of interaction. According to their results, most students felt that Twitter facilitates learner-learner interaction and encourages class participation, discussion, and attendance. However, they stressed the negative effects, especially highlighting how Twitter can be distracting or overwhelming.

RESEARCH METHOD
When investigating real-life phenomenon in an in-depth manner, the case study method is one of the most suitable research options (Yin, 2009). The researchers investigated the very new use of Twitter within an instructional context at a private university in Turkey. Within the case study, the researchers utilized both quantitative and qualitative data gathering techniques. Furthermore, participants filled out a quantitative survey three times: before, during, and after implementation. Qualitative open-ended questions were utilized to complement the quantitative data results. Lastly, the Twitter account was analyzed by a special website for gathering usage statistics.

Research Questions
This study focused on the idea that easily accessible microblogging sites can be transferred from daily use to instructional use, benefitting the learning process. Thus, research investigated how a microblogging website can be used as an instructional tool to identify its advantages and disadvantages. Due to its popularity, the researchers selected Twitter. This study answers the following four sub-questions:

- What are the students' general perceptions of using Twitter in a learning-teaching context?
- Is there a change in the students' use of Twitter over the three phases of the course?
- How do the students perceive Twitter as a daily tool and as an instructional tool?
- What are students' experiences using Twitter in a learning activity?

Participants and Context
The IS 204 - Computer Applications in Social Sciences course was offered in the International Relations department at a private university in Turkey. Data were collected from 48 enrolled students (26 females, 54%; 22 males, 46%). The course was held for 4 hours per week in the 2010-2011 spring semester. One of the authors was the course instructor, who provided instruction in English at a computer laboratory over 14 weeks. The course covers a general overview of the Microsoft Office suite: word processing using Word, spreadsheets in Excel, presentations with PowerPoint, and databases in Access. Course assessment criteria included a midterm examination (25%), final examination (35%), homework (20%), attendance (10%), and presentations (10%).

During the first week, students who already had Twitter accounts were required to follow the account for the course (http://twitter.com/IKUIS204). The instructor explained how to use Twitter and its features, such as mentions and retweeting, and students were encouraged to practice. Each week, four students were responsible for posting a topic on both their personal accounts and the course account, where the rest of the classroom would tweet on the topic. Topics were related to computer sciences and approved by the course instructor before posting. Each Sunday, a new group submitted a topic, and the previous group prepared a report including tweets students submitted (in Word) and the number of tweets per student (in Excel).

To assist with counting tweets, students had to add @IKUIS204 to the beginning of their tweets, which could be sent whenever and wherever they wanted. Students were free to access their accounts during class, and the instructor checked the course account to provide feedback as needed. Additionally, during the week, the course instructor replied to the chosen topic and encouraged students to tweet their own responses.

Data Sources
The main data sources of this study were surveys developed by the researchers. Statistics obtained from TweetStats (http://tweetstats.com/), which provides data about Twitter activity and user preferences and actions, were used as a supplementary data source. The quantitative data were strengthened by the analysis of qualitative open-ended questions. The quantitative survey had three parts. The first part asked for each respondent's gender and whether the respondent possessed a Twitter account. The second part encompassed the students' use of Twitter and its features, the number of people each student followed, the number of followers for each student,

and the students' access preferences and competency levels. The third part of the survey consisted of 19 questions about Twitter usage in instruction. The survey was developed after an extensive review of the literature and Web 2.0 scales used in other contexts. The instrument was also evaluated by two experts in the instructional technology field for content and face validity. The qualitative data consisted of 7 open-ended questions developed to investigate advantages and challenges of using Twitter for instructional purposes. Qualitative data analysis provided in-depth knowledge for the study.

Data Collection and Analysis
The quantitative survey was administered three times during the course (Phase I, Phase II, and Phase III) with the aim of revealing changes in Twitter usage during instruction. In Phase I, data were collected in the first week of the course. Phase II was implemented in week seven, halfway through the semester. The survey was conducted in week 13, and the open-ended survey was implemented in week 14, during the final exam. The quantitative data for each phase were analyzed using descriptive statistics, while the questionnaire items were analyzed with a one-way repeated measure ANOVA. Before these analyses, five questionnaire items (items 14, 26, 29, 31 and 32) were re-coded due to negative meanings. Cronbach's Alpha Coefficient was used to check the internal consistency of the scale for each phase; the values for Phases I, II, and III were .88, .90, and .84, respectively, suggesting very good internal consistency.

For the open-ended questions, the researchers used content analysis for both qualitative data reduction and identifying core consistencies and meanings. To identify themes, data sets were analyzed line by line to determine how frequently categories related to the research questions appeared. Afterwards, the data for each open-ended question were grouped under the main themes and categories. These qualitative coding procedures, theme and category derivation processes, and quantification of determined categories were shared and discussed among the researchers. Percentage agreement (Miles and Huberman, 1994) and Cohen's Kappa were used to assess inter-rater agreement. The initial inter-coder reliability was 77%. After reaching a consensus on codes, the final agreement was 98%. Cohen's Kappa value was 0.95, which indicates very good agreement between coders (Pallant, 2007). In order to enhance the quality and credibility of analysis, a synthesis of qualitative data and processes followed when drawing conclusions were reviewed and discussed by the researchers.

RESULTS
Participants and Twitter Usage
Most of the students (n =3 2) had Twitter accounts at the beginning of the semester (Table 1). Fourteen students created accounts Twitter in Phase II, while two students never joined. It is possible to assert that students' Twitter usage increased gradually as the course progressed.

Table 1: Twitter Account Possession

	Phase I	Phase II	Phase III
Yes	32	46	46
No	16	2	2

Table 2 summarizes the students' changing ideas about Twitter's options and features. Apart from sharing photos and web addresses, each phase saw a rise in use. Table 2 shows that the sharp increase in the use of retweets and direct messages continued across all phases.

Table 2: Usage of Twitter and Its Features in Phases I, II, and III

Twitter Options and Features	Phase I			Phase II			Phase III		
	Yes	No	Don't know	Yes	No	Don't know	Yes	No	Don't know
I use "@Mentions"	24	6	2	31	10	1	38	7	1
I use "Retweet"	16	11	3	31	11	-	40	6	-
I use "Lists"	19	11	2	30	11	2	33	12	1
I use "Direct Messages"	14	13	2	35	7	1	40	5	1
I share photos	13	14	5	20	23	-	19	22	4
I share web links	13	15	4	24	17	1	29	13	4

In addition to the increased use of options and features, the more students used Twitter, the more followers they gained and the more people they followed. Moreover, there was an observed increase in both the number of followers and the number of people being followed. The increase in the number of followers is an indication of students' elaborations on Twitter, which might reflect on its instructional use. As students followed others who

might be knowledgeable on a specific topic, the probability of learning occurring increased by means of shared and created knowledge capital between the followed people and students.

Table 3: Number of People Students Follow and Their Followers in Phases I, II, and III

Number of People	Phase I Follows	Followers	Phase II Follows	Followers	Phase III Follows	Followers
10 or fewer	4	4	3	2	2	1
11-30	11	15	6	6	5	6
31-50	12	10	19	23	10	9
51-70	2	2	7	7	14	19
71-90	-	1	2	2	4	4
91-110	2	1	1	2	2	3
111-130	2	-	2	-	3	-
131-150	-	-	1	1	2	1
More than 151	-	-	3	1	3	3

According to the statistics obtained from TweetStats, most tweets were sent on Fridays (the day of the course) and Sundays (the day the topic was posted on Twitter). Moreover, students favored sending tweets between 9:00 p.m. and 1:00 a.m, explaining why home was the most preferred access place for all phases (Table 4). Mobile phones and schools were also selected as Twitter access places. Also, the course instructor allowed students to access their Twitter accounts to ask questions and share ideas about weekly course topics during class.

Table 4: Students' Twitter Access Preferences in Phases I, II, and III

Access Places	Phase I	Phase II	Phase III
Home	32	41	45
School	20	35	39
Dormitory	3	4	4
Work	1	3	3
Internet Cafe	3	6	8
Mobile Phone	15	27	33
Friend's Computer	2	7	15

Table 5 demonstrates that students' perceived competency levels also increased. Most students believed that their competency level was good or very good by Phase III, but it is not possible to infer any variations in Phases I and II. According to statistics, 235 tweets were sent in April, while 110, 176, and 8 tweets were sent in February, March, and May, respectively, which might explain these changes.

Table 5: Twitter Competency/User Level

Level	Phase I	Phase II	Phase III
Poor	6	4	3
Fair	6	5	5
Good	14	25	18
Very Good	2	5	16
Excellent	2	5	4

Twitter Usage in Instruction
The Survey
According to @IKUIS204 statistics, the average number of tweets for the entire class was 9.4 per day and 132 per month during the course. Descriptions, means, and standard variations of the survey items are listed in Table 6 in accordance with the questionnaire format and phases.

Table 6: Mean Scores and Standard Deviations of Twitter Usage in Instruction Items

No.	Item	Phase I M.	S.D.	Phase II M.	S.D.	Phase III M.	S.D.
1	I define myself as anti-Twitter.	2.45	1.30	2.06	1.27	1.75	0.95
2	Twitter could be a good learning tool.	3.06	0.95	3.60	0.76	3.81	0.81
3	Twitter could be a good teaching tool.	3.25	0.83	3.56	0.76	3.87	0.70
4	Twitter could be integrated in a university for teaching-learning.	3.31	1.11	3.64	0.93	4.00	0.68
5	Twitter should be integrated in non-formal education.	3.02	1.08	3.50	0.98	3.81	0.81

No.	Item	Phase I		Phase II		Phase III	
		M.	S.D.	M.	S.D.	M.	S.D.
6	Twitter could be used as a supplementary medium for instruction.	3.12	1.10	3.58	1.02	3.85	0.77
7	Using Twitter could make learning more enjoyable.	3.41	1.18	3.70	0.98	4.18	0.76
8	Twitter could serve as a learning tool by allowing learners to share their personal experiences.	3.68	1.14	3.97	0.83	4.16	0.63
9	I would like to contribute to discussions on Twitter.	3.35	0.99	3.83	0.90	3.79	0.68
10	Using Twitter to participate in group discussions could be very exciting to me.	3.19	1.10	3.54	1.12	3.68	0.87
11	I have no fear of using Twitter to communicate with other people.	3.83	0.78	4.00	0.85	4.37	0.81
12	I feel confident in my ability to clearly express my ideas on Twitter.	3.35	1.21	3.89	0.95	4.06	0.80
13	I'm afraid that my ideas on Twitter could be used without my permission.	4.06	1.41	2.06	1.00	2.72	1.10
14	I believe that Twitter will be used at schools in the future.	3.00	1.31	3.31	0.92	3.52	0.94
15	Student tweets during a course may increase the course's effectiveness.	3.08	1.39	3.83	1.07	4.14	1.01
16	Sending tweets during a course may distract attention.	4.04	4.65	2.75	1.31	2.58	1.25
17	I believe that Twitter may have an effect on community structure.	3.12	1.37	3.37	1.00	3.50	1.03
18	I believe that Twitter intervenes in private life.	3.10	1.05	2.16	1.07	2.22	0.95
19	I do not understand the people writing Tweets all the time.	3.52	1.36	3.41	1.51	3.35	1.52

The participants' belief in Twitter's possible power as a teaching and/or learning tool increased as time elapsed over the semester. Additionally, the participants emphasized that Twitter should be integrated into both non-formal learning settings and formal university settings, mostly as supplementary material. The participants agreed that Twitter has the potential to make classrooms more enjoyable settings. However, although the mean score slightly increased, the participants still did not totally agree on Twitter's future place in schools. The participants believed that sending tweets about personal experiences or ideas could be an effective way of creating knowledge and learning. According to the mean scores, the participants were comfortable tweeting their personal standpoints on Twitter. As participants spent more time on Twitter, their self-confidence in expressing themselves increased; more specifically, the mean scores show that the participants overcame their fears of being bullied about their tweets. The mean scores demonstrate that participants agreed that Twitter increased course effectiveness. Moreover, as participants practiced using Twitter during the course, the mean scores relating to distraction decreased, though participants might understandably find it difficult to send and read tweets while following instruction in class. With more practice, the degree of feeling distracted might lessen. The participants appeared to be neutral about Twitter's effect on altering communities, and they somewhat disagreed that Twitter could disturb people's private lives.

The differences in perspectives on Twitter usage in instruction between Phases I, II, and III were statistically checked by a one-way repeated measures ANOVA for each item. Table 7 demonstrates 14 significantly different items and the results of the test values.

Table 7: Significantly Differing Items

No.	Item	F	*P*	η^2
1	I define myself as anti-Twitter.	5.14	.010	.18
2	Twitter could be a good learning tool.	8.75	.001	.27
3	Twitter could be a good teaching tool.	7.81	.001	.25
4	Twitter could be integrated in a university for teaching-learning.	7.21	.002	.23
5	Twitter should be integrated in non-formal education.	9.12	.000	.28
6	Twitter could be used as a supplementary medium for instruction.	8.30	.001	.26
7	Using Twitter could make learning more enjoyable.	8.63	.001	.27
8	Twitter could serve as a learning tool by allowing learners to share their personal experiences.	3.69	.033	.14
9	I would like to contribute to discussions on Twitter.	3.35	.044	.12
11	I have no fear of using Twitter to communicate with other people.	6.20	.004	.21
12	I feel confident in my ability to clearly express my ideas on Twitter.	5.93	.005	.20
15	Student's tweets during a course may increase the course's effectiveness.	7.94	.001	.26

| 16 | Sending tweets during a course may distract attention. | 4.57 | .016 | .17 |
| 18 | I believe that Twitter intervenes in private life. | 11.60 | .000 | .33 |

After 14 significantly differing items were identified through a one-way repeated measures ANOVA test, the effect size values were calculated to assess the importance of these differences. The partial eta squared values fluctuated between .14 and .33 (Table 7) for the significantly differing items, indicating a very large effect size.

For items 1, 3, 4, 5, 6, 8, 9, 11, 12, and 16, there was a significant difference across all phases. From the mean scores, one can conclude that as the students practiced using Twitter in an instructional setting, they became more acquainted with its advantages as a supplementary teaching tool in higher education institutions. Moreover, the students seemed more willing to participate in discussions on Twitter in terms of sharing their own perspectives over time. Their self-reliance on communication via Twitter was accounted for in all phases. For item 2, which focused on the role of Twitter as a learning tool, significant differences were observed in Phase I-Phase II and Phase I-Phase III. Participants' opinions on the role of Twitter as a learning tool did not change significantly until the end of the course. For item 7, which focused on the fun Twitter added to instruction, significant differences were observed in Phase I-Phase III and Phase II-Phase III. Between the first week (Phase I) and midterm week (Phase II), participants tried to discover the effects of Twitter on instructional activities and may have missed its enjoyable side. On the other hand, after the students used Twitter more, they discovered its positive effects. For item 15, focusing on using Twitter as a tool to increase effectiveness, significant differences were observed in Phase I-Phase II and Phase I-Phase III. After the mid-term exam, the students felt the effects of Twitter's ability to increase the quality of the course. For item 18, which focused on Twitter's interference in private life, significant differences were observed in all stages: The participants disagreed in all phases about Twitter's intrusion into people's personal lives.

Open-Ended Questions
Question1: For what other purposes could Twitter be utilized within the course? What are your recommendations?
The participants focused on two major themes, communication and sharing information, and had many recommendations: discussions (n = 5), making comments (n = 3), arranging appointments (n = 3), and following current news (n = 2). The participants also listed items to share on Twitter such as deadlines for homework (n = 4), grades (n = 4), exam topics (n = 4), fundamental points about the course (n = 3), questions about homework (n = 3), weekly course schedules (n = 3), activities (n = 2), personal experiences (n = 2), short summaries (n = 2), software (n = 2), reinforcement for students (n = 1), links to encourage research (n = 1), conferences (n = 1), lecture notes (n = 1),and videos (n=1). One student explained:

> The main difference between Twitter and Facebook is that Twitter could provide many advantages. Especially when we look at the last revolutionary movements in the Middle East, we can see its great effects. Outside of the course, we can chat on political, economic, social, and sports issues.

Question 2: Which aspect(s) of Twitter do you like?
The participants identified many positive aspects of Twitter. Twelve students emphasized how it makes self-expression easy. Similarly, eight students pointed out that Twitter is a good tool for sharing knowledge simultaneously. The participants specifically paid attention to the ability to follow celebrities (n = 6), other Tweeters (n = 6), course content (n = 3), different websites (n = 2), and friends (n = 2). The participants liked Twitter's communication options (n = 3), direct messaging (n = 5), mentions (n = 4), retweeting (n = 3), sharing photos (n = 2), and customizable color and background (n = 1). One participant wrote:

> With the Mentions feature of Twitter, I can follow when my friends make a comment about me. I can learn the ideas of celebrities, authors, and my friends regarding politics, economics, and cultural issues. I feel happy when I see that some people retweet my ideas on their profiles.

The participants also concentrated on the technological structure of Twitter. Some participants (n = 2) indicated that Twitter is better than Facebook. The students also noted that Twitter is speedy (n = 4), easy to use (n = 3), and interactive (n = 3), allowing members to block unwanted contacts (n = 3) and lock their tweets (n = 1).

Finally, the participants considered Twitter's social aspects. One participant stated that Twitter is a good place to analyze a person's true characteristics and agenda. Similarly, another participant focused on Twitter's role in arousing curiosity about what is written by followers. The participants specified that Twitter is a funny tool (n = 4) that provides a social context (n = 2) to meet new people (n = 1).

Question 3: Which aspect(s) of Twitter don't you like?

For this question, participants focused on two themes: technical issues and human-related challenges. They complained about unnecessary tweets (n = 14), abuse of human relationships (n = 4), fake accounts (n = 3), and spending too much time on Twitter (n = 1). The participants criticized Twitter's functional errors (n = 6), including overcapacity (n = 3), visual design (n = 2), the 140-character limitation (n = 4), difficulty sharing photos (n = 4), and limited language options (n = 2). One participant compared Twitter to Facebook, noting that there is no "Like" option, and another felt that Twitter is not as detailed as Facebook.

Question 4: What did you like most about utilizing Twitter within the course?

Answers were centered around two themes: management of instruction and teaching. The students were glad to follow grades and homework (n = 5) and course content (n = 4) on Twitter. They pointed out that Twitter made instruction funnier (n = 16) and increased in-class communication (n = 8), participation (n = 6), communication with the instructor (n = 5), attention to the course (n = 5), and course interactivity (n = 5). The participants were happy to share ideas (n = 10), to tweet during class (n = 8), and to discuss course topics (n = 5).

Question 5: What didn't you like about utilizing Twitter within the course?

Twenty students complained about unnecessary tweets. Moreover, ten students noted that sending tweets during class was distracting. Two students were not pleased with the obligatory contact with other students. Lastly, three participants specified disappointment with jokes in tweets.

Question 6: What problems did you experience while utilizing Twitter within the course?

The participants concentrated on two themes: Twitter-related and instruction–related. Examples of Twitter-related problems included delayed uploads of tweets (n = 5), functional errors when opening Twitter (n = 3), the restriction to 140 characters (n = 1), following people (n = 1), organizing a personal profile (n = 1), password problems (n = 1), use of mentions (n = 1) and tagging people (n = 1). For instruction-related problems, the participants focused on Twitter's distracting effects (n = 7), unnecessary tweets (n = 4), and its obligatory use in the course (n=1).

Question 7: Do you want to continue using Twitter for teaching/learning purposes after the course? Why?

Twenty-eight participants were eager to use Twitter for instruction in prospective courses because they can share course content (n = 13), communicate with others (n = 3), ask questions (n = 2), stay updated (n = 2) and follow assignments (n = 1). Moreover, Twitter is an important medium (n = 2) that is enjoyable (n = 2) and more suitable for education than Facebook (n = 1). Two participants emphasized that how people use Twitter in an educational setting must be parallel with course objectives, and one participant stressed that students should not use Twitter during instruction. However, two students were hesitant about using Twitter in education, and fourteen students were against it. Four participants stated that other instructors would not use Twitter in their courses. Three participants found Twitter unnecessary for education, while two others believed it is not beneficial. Other reasons stated by participants included distractions (n = 1), the 140-character restriction (n = 1), and privacy issues (n = 1).

Limitations

This study is limited by several conditions. First and foremost, this limited sample of Twitter users is not necessarily representative of all Twitter users. Secondly, the study is limited to explore impacts on learning outcomes being expected students to demonstrate after the course. Thirdly, the relationship between microblogging, fun, and learning is not fully investigated through the study. Another limitation is that the data relies on the instruments used in the study. Interviews to obtain in-depth information about the purpose of the research might have additional insight. Moreover, the following limitations are also relevant to the study: (a) the validity of this study is limited to the reliability of the instruments, (b) validity is limited to the honesty of the participants' responses to the study instruments. Lastly, this study was realized with a specific group of students using a specific microblogging website, Twitter. Hence, study results are highly dependent on this context. Therefore, the same study should be replicated within other contexts for further investigations in order to validate the findings.

DISCUSSION AND CONCLUSION

This research study was conducted with the purpose of using the microblogging website Twitter as an instructional tool in the Computer Applications in Social Sciences course offered by the International Relations department of a private university. The students' experiences using Twitter in a learning-teaching context were tracked over three periods. The study results suggest that Twitter could be used as part of the instructional process in higher education. Furthermore it is possible to assert that the more students are engaged with Twitter

in a learning context, the more they will use its options and applications for both personal and instructional purposes.

Although students' satisfaction with Twitter's features and applications can be explained by the frequency of usage (Chen, 2011), other factors also play a fundamental role in ensuring effectiveness in educational settings. First, educational environments might be more enjoyable with the integration of Twitter. As noted in the results, Twitter adds more fun to instruction, especially integrated in daily activities. Second, Twitter allows students to create and share knowledge easily (Bozarth, 2010). Because Web 2.0 tools help people obtain information quickly (Thelwall, 2008), the sharing and creation of knowledge for instructional purposes also increases the effectiveness of instruction. Third, students can communicate easily and efficiently with each other and with their instructor about course content, assignments, and grades via applications such as @Mentions, retweets, lists, and direct messages. These options strengthen the self-confidence and self-expression of students in discussions (Dunlap & Lowenthal, 2009). While participating in discussions on Twitter about their perspectives and experiences, students can overcome their fears and be a part of the classroom community (Bozarth, 2010). These favorable factors should be investigated more deeply to determine the exact roles and correlations of effective instructional implementation of Twitter in educational settings.

In addition to these positive factors, educational researchers should focus on potential adverse effects of Twitter in instructional environments, as well. Most complaints were about unnecessary tweets during instruction. Dunlap and Lowenthal (2009) have warned that these drawbacks can lead to distraction. Fox and Varadarajan (2011) reported similar cases and concluded that Twitter could be distracting and overwhelming even when used properly. Therefore, studies that reveal precautions instructors should take during instruction are highly needed, as there is currently no model for using Twitter or other Web 2.0 tools in education, especially higher education (Greenhow, Robelia, & Hughes, 2009).

Sorensen and Skouby (2009) have predicted that mobile technologies will increase the significance of microblogging websites. As clarified in this study, students' Twitter access preference is consistent with their preference to access Twitter at home and at school. Since the use of mobile technologies in schools and societies has become increasingly pervasive, studies that focus on effective and efficient use of Twitter in educational settings might address the question of how students' use Twitter in and out of educational environments.

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WEBQUEST USAGE IN DEMOCRACY, HUMAN RIGHTS AND CITIZENSHIP EDUCATION[1]

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ABSTRACT

The purpose of this study is to assess the performances of social studies teacher candidates in using WebQuest applications in Human Rights, Democracy and Citizenship Education. WebQuests are tools that are used to create constructivist learning environments for students by using web resources. WebQuests allow students to do internet research while minimizing the risk of getting lost on the net. The study employs five different WebQuests about human rights, democracy and citizenship prepared as part of a bigger research project. The five different WebQuests about sensitive social issues were completed by teacher candidates over the course of 12 weeks. The subjects of the study were 120 students allocated to four experiment groups at two state universities in Turkey. The students completed the WebQuests in groups. The assessment criteria for the WebQuests were incorporated as rubrics. According to rubric assessments, all teacher candidate groups displayed mid and low level performance. However, it is thought that the use of WebQuest as a web-based instructional tool in a constructivist approach in higher education may be helpful.

Keywords: WebQuest; Teacher training; Citizenship education; Web-Supported learning

INTRODUCTION

The internet is now an amazingly and rapidly developing and changing phenomenon. Therefore, the use of the internet in learning and teaching processes in schools is inevitable. Its usage cannot be independent from schools and learning activities.

Although the use of technology in education is nothing new, internet use for educational activities has created a new and different research and application area. Distance education through the internet is an explicit example of it. The use of the internet in formal education at elementary and secondary levels is becoming more and more important. For the time being, distance education is only offered to undergraduate and graduate students in an effective way, because their cognitive level is thought to be more suitable.

The possible role of internet use at school, the advantages and disadvantages entailed, the design and quality of internet-based activities at school, and the productivity and success of the applications are very important issues that have been drawing researchers' attention. In this respect, the WebQuest applications are significant for internet-based learning and teaching activities (Erişti, Şişman & Yıldırım, 2008).

WebQuest in Teacher Training

As in the rest of the world, there has also been a paradigm shift in Turkey over the last fifty years. The most critical period in this paradigm shift in our country was the 2004-2005 academic year when the education system was changed dramatically. The philosophy of education was channelled towards the constructivist approach, which emphasizes self-teaching rather than teaching (Yaşar, 1998), students rather than teachers, (Özden, 2005), and forming knowledge rather than memorizing knowledge. The WebQuest applications suggested by Dodge (1997) are among the instructional activities used in the constructivist approach. He describes constructivist instructional activities in WebQuest applications as learners' responsibility through filtering knowledge with a questioning mind, and interacting with other learners. According to Dodge (1995), a well designed WebQuest application helps students reach high level cognitive learning objectives; such as analysis, synthesis and evaluation. WebQuest applications classified as long term or short term applications must have the following basic processes: introduction, research project, defined internet sources, defined steps, instruction, and result (Dodge, 1995).

Zheng, Stucky, McAlack, Menchana and Stoddart (2005) claim that at the backstage of learning, the WebQuest applications are supported by four basic structures – critical thinking, knowledge application, social skills, and constructive learning. With these applications, students access resources designed and/or limited by the teachers themselves instead of randomly surfing the net through large chunks of information, which is a very important skill. Thus, WebQuest can provide productive learning environments for students without exposing them to information pollution (Skylar, Higgins & Boone, 2007; Şen &Neufeld, 2006).

Yang, Tzuo & Komara (2007) find that WebQuest as a learning approach and learning tool in teacher training programmes makes a great contribution to prospective teachers' understanding of students' individual differences and different learning styles. It is concluded that compared to other traditional learning-teaching methods, teachers use critical thinking and problem-solving skills more often with WebQuest applications. Moreover, WebQuest applications encourage students and teachers to make more use of technology in classes (Yang, Tzuo, Komara; 2011). Another study similarly shows that using WebQuest applications as a learning-teaching activity in teacher training programmes helps teacher candidates reach higher learning levels (Allan & Street, 2007). It is thought that using WebQuest applications in social studies education – especially in human rights, democracy and citizenship education – is very important. Today's children as the future's "digital citizens" should acquire such basic skills as having wider networks, being more collaborative, having a global awareness, needing less paperwork, being fluent in web languages, and being in contact with knowledge organizers globally (Froelich, 2009). In this context, the structure and qualities of WebQuest applications will ease and support the acquisition of these skills.

STUDY
The aim of this study is to observe the performances of teacher candidates in completing WebQuests duties given in Human Rights, Democracy, and Citizenship Education courses.

Method
In this study, document analysis was utilized to analyze and evaluate WebQuest homework and presentations obtained from student groups involved in 'a web-supported effective human rights, democracy and citizenship education project' Quantitative data was generated and commented through rubrics. Details about rubrics are provided in subsequent sections.

Research Group
The research group consisted of 120 teacher candidates studying in their second year at social studies departments of two state universities. The data came from these students who were assigned to four experimental groups for "a web supported effective human rights, democracy and citizenship education project." The project was designed to measure the possible effects of internet usage in instruction. The main point of interest in this section of the data was related to WebQuests.

Obtaining Documents
The documents used in this research were collected in the course of the "web supported effective human rights, democracy and citizenship education project" which was in quasi-experimental Solomon four-group research design. With the experimental groups, the classes were conducted with the support of internet activities. In class, the students were required to do group work. They were asked to use five WebQuests in four themes, i.e. two WebQuests about peace and war, one about democracy, one about globalization, and one about the media. These WebQuests were about (1) Peace and Violence, (2) Violence against Women, (3) Classroom Constitution, (4) Globalization, the Internet, and Culture, and (5) Media Literacy. Each WebQuest assignment required web research homework, which was evaluated by rubrics utilized for this study.
The content of homework in WebQuests:

1. In "Peace and Violence," the students were asked to do research with the examples given, analyze the causes of violence disrupting society and peace, suggest measures for fighting against violence, and explain judicial processes about violence. Then, they were asked to write a report on violence with all its dimensions and prepare the lists of recommendations for solutions to violence.
2. In "Violence against Women," the students were asked to prepare a presentation regarding violence against women in Turkey. They completed tasks including types of violence, works of governmental and non-governmental organizations (NGOs) for protecting women.
3. In "Democracy," the groups were asked to write up "a classroom constitution." The content of this theme included rules of governing, rights and freedoms, main rules in classroom, creating units representing the legislative, executive, and judicial organs.
4. In "Globalization," the groups were asked to prepare a PowerPoint presentation about globalization. The content of globalization includes the meaning and dimensions of globalization, its advantages and disadvantages, and its effects on national culture.
5. In "Media Literacy," the groups were asked to define the concepts of "literacy", "information literacy", "information technologies and technological literacy", "computer literacy", "network (internet) literacy", "electronic literacy", "critical thinking skills" and "education and literacy". Then, they were asked to relate them to "communication", "communication tools", "mass communication",

"media", "message", "media education", "media literacy", "disinformation" and "propaganda" on a PowerPoint platform.

Data Analysis

Two different rubrics were used to analyze the WebQuest assignments. For the WebQuests on globalization, internet and culture, media literacy, peace and violence, and violence against women, the same rubric was used, with a different one used for the classroom constitution. These rubrics had five steps. Each step was graded low (1 point), medium (2 points), and high (3 points). The rubric used for the WebQuest assignment on Peace and Violence, Violence against Women, Globalization, and Media Literacy is given in Table 1.

Table 1: Rubric for the WebQuest assignment on Peace and Violence, Violence against Women, Globalization, and Media Literacy

	Low 1	Medium 2	High 3	Point
1st Step: Definition	Problem is defined but the factors creating the problem are not determined.	Problem is defined and factors creating the problem are determined but not illustrated.	Problem is accurately defined and factors creating the problem are defined and well illustrated.	
2nd Step: Internet Research and Analysis	Internet research about the problem is inadequate, no analysis.	Internet research about the problem is done but no analysis of comments on the news.	Internet research about the problem is done, comments on the news are analyzed and comments are made about the communities' points of view.	
3rd Step: Interpretation	No interpretation	Inadequate interpretation	Very good interpretation	
4th Step: Recommendations on the subject	Inadequate recommendations for preventing the problem and recommendations are not justified.	There are recommendations to solve the problems but recommendations are not justified.	Adequate recommendations for the problem are presented with their justifications.	
5th Step: Report and presentation	Report is prepared but no citations are given. PowerPoint presentation does not reflect the content adequately.	Report is prepared with citations, but PowerPoint presentation does not reflect the content properly.	Citation is used when the report is prepared and PowerPoint presentation reflects the content properly.	

The rubric used to assess student performances in fulfilling the tasks in "Classroom Constitution" is presented in Table 2.

Table 2: Rubric for the WebQuest assignment on Classroom Constitution

Steps	Low	Middle	High
Reading sources	Most of the resources are not read	Most of the resources are read, but not assimilated	All resources are read and assimilated
Rights and freedoms	Rights and freedoms are not stated	Rights and freedoms are partially stated	All rights and freedoms are stated and explained
Minority rights	Minority rights are not stated	Some minority rights are stated	All minority rights are stated and explained
Fundamental rules	Few fundamental rules are stated	Most of the rules are stated	All possible rules in classroom are stated and explained
Main establishments	Main establishments are not stated	Main establishments are stated, but their responsibilities are not stated	Main establishments and their responsibilities are stated

WebQuest homework included 17 assignments in Peace and Violence, 19 in Violence against Women, 5 in Globalization, Internet, and Culture, 7 in Media Literacy, and 8 in Classroom Constitution. The highest and lowest points are shown in Table 3.

Table 3: *Numbers of Assignments Submitted by Groups with Minimum and Maximum Points*

WebQuest theme	Number of assignments	Minimum point	Maximum point
Peace and Violence	17	17	51
Violence against Women	19	19	57
Globalization, Internet and Culture	5	5	15
Media Literacy	7	7	21
Classroom Constitution	8	8	24

To improve internal consistency, the ratings were given to two different experts for analysis in case of subjective results (Yıldırım and Şimşek, 2008). The results from the experts' judgments were compared and included in the report.

FINDINGS

The students' points in the Peace and Violence WebQuest rubrics are presented in Table 4. For "Peace and Violence," there was homework from 17 different student groups. The points they received for the homework were calculated by means of the rubrics and are presented in Table 4.

When the first step (definition) was reviewed, it was seen that six groups completely and accurately defined "Peace and Violence," and these groups determined the factors causing peace and violence with examples added. The results of eight groups were rated 'good' by the same criteria. These eight groups made correct definitions but did not mention the factors causing the problem. Further, it was understood that three groups did not make a correct definition or mention the factors affecting the occurrence of this problem.

Table 4: *Students' Points for WebQuest Assignment Themed Peace and Violence*

		n	Low 1	Medium 2	High 3	Total Point
1st step	Definition	17	3	8	6	37
2nd step	Internet Research and Analysis	17	6	7	4	32
3rd step	Interpretation	17	10	4	3	27
4th step	Recommendations on the subject	17	6	7	4	32
5th step	Reporting and Presentation	17	9	5	3	28
Between 17 and 28,6 points low; between28,7 and 40,3 points medium; between 40,4 and 51 points high						

When the second step (Internet Research and Analysis) was reviewed by means of the rubric, it was understood that four of the groups did internet research and analyzed the comments the society made on the news and they also made comments on the society's points of view about the subject. On the other hand, it was found that seven groups did internet research on "peace and violence" but did not analyze, and six groups were rated inadequate in internet research and there was no analysis.

When the third step (Interpretation of Peace and Violence) was reviewed, it was seen that three groups interpreted the problem completely. Four groups' interpretations were inadequate. Ten groups offered no interpretations on the subject.

The fourth step of WebQuest homework was "Recommendations." It was noted that four groups made adequate recommendations in their reasons. Seven groups made recommendations but did not mention the reasons. Six groups made inadequate recommendations about "Peace and Violence", and did not give any reasons.

The fifth step of WebQuest homework was "Reporting and Presentation". When the assignment was reviewed, it was seen that three groups made citations and reflected the content completely in their reports. Five groups made citations, but did not reflect the content adequately, and nine groups did not cite or reflect the content properly.

Total points of the groups for the "Peace and Violence" assignment were calculated through rubrics. When the total points were reviewed, the groups turned out the most successful in the definition step and the least successful in the interpretation step. Additionally, the groups' performance was top in the definition step but medium in internet search and analysis, interpretation, recommendations on the subject, and reporting and presentation.

The total points of students in "Violence against Women" WebQuest are presented in Table 5.

In the "Violence against Women" subject, there was homework from 19 different student groups. The points that the student groups received for the assignment were calculated by means of the rubrics and are presented in Table 5. When this table was reviewed for the first step, eight groups completely defined violence against women and determined the factors causing it. They also provided explanations with examples. Three groups determined the factors causing the problem but did not give any example. Eight groups only defined violence against women, but did not indicate the factors underlying it.

Table 5: *Students' Points for WebQuest Assignment Themed Violence against Women*

| | | n | Low | Medium | High | Total Points |
			1	2	3	
1st step	Definition	19	8	3	8	38
2nd step	Internet Research and analysis	19	7	6	6	37
3rd step	Interpretation	19	10	6	3	31
4th step	Recommendation on the subject	19	9	6	4	33
5th step	Reporting and Presentation	19	8	9	3	35

Between 19 and 32 points low; between 33 and 46 points medium; between 47 and 57 points high

When the second step, "Internet Research and Analysis", was reviewed, six student groups were found to have done internet research on "Violence against Women." They also analyzed the comments on the news about the subject, and they commented on the society's points of views about the subject. On the other hand, six student groups did research on "Violence against Women" but did not analyze the comments on the news. Seven groups did not carry out adequate research on the internet and failed to analyze the comments.

When the third step (Interpretation) was reviewed, it was found that three groups interpreted the problem. Four groups inadequately interpreted the problem, and 10 groups did not make any interpretations on the subject.

The fourth step of WebQuest homework was "Recommendations." It was understood that four groups put forward sufficient recommendations with their reasons for preventing violence against women. Six groups made recommendations to prevent violence against women, but did not give reasons. Nine groups made insufficient recommendations and did not provide reasons either.

The fifth step of WebQuest homework was Reporting and Presentation. Three groups used citation and reflected the content of "violence against women "completely. Nine groups made citations, but did not reflect the content properly. Eight groups did not make citations or reflect the content properly in their reports.

When the groups' total points for WebQuest homework "Violence against Women" were reviewed, they were found to be the most successful in the definition step but the least successful in the interpretation step. Accordingly, while the groups' performance was low in the interpretation step, their performance in definition, internet research and analysis, reporting, recommendations, and presentation was rated medium.

The total points received by the student groups for WebQuest homework about globalization is shown in Table 6. In this subject, there was homework by five groups of students. The points that the students received for their assignments were calculated via rubrics and are presented in Table 6. According to Table 6, when the first step, definition, was reviewed, it was seen that three groups clearly defined globalization, determined the factors affecting it, and explained them with supporting examples. However, two groups defined globalization and determined the factors affecting it without giving any examples about the factors.

Table 6: *Students' Points for WebQuest Assignment Themed Globalization*

		n	Low	Medium	High	Total points
			1	2	3	
1st step	Definition	5	0	3	2	12
2nd step	Internet Research and analysis	5	0	3	2	12
3rd step	Interpretation	5	0	3	2	12
4th step	Recommendations on the subject	5	0	3	2	12
5th step	Reporting and Presentation	5	0	4	1	11
Between 5 and 8,6 points low; between 8,7 and 12,3 points medium; between 12,4 and 15 points high level						

When the second step, "Internet research and analysis", was reviewed, two groups were found to have done internet research and analyzed the comments on the news about this subject and interpreted the society's points of view about this subject. Three groups did internet research about the subject without analyzing the comments on the news.

When the third step, interpretation, was examined, it was seen that two groups completely interpreted the subject whereas three groups interpreted it inadequately.

The fourth step of the WebQuest assignment was "recommendations on the subject". When this step was studied, it came to light that three groups recommended sufficient precautions to prevent problems caused by globalization and they included the reasons for these precautions. Two groups recommended precautions to prevent problems but did not mention their reasons.

The fifth step of the WebQuest assignment was "Reporting and Presentation". For globalization, this step revealed that one group used citation in reports and completely covered the content. Four groups made citations in their report but did not reflect the content properly.

When the total points of the groups for WebQuest homework were reviewed, it was found that students were best at defining, but the least successful in reporting and presentation steps. It was also found that their performance in all steps was rated as medium.

The total points of the experiment group students for WebQuest homework about "Media Literacy" are shown in Table 7. In "Media Literacy", there was homework by seven groups of students. The points that the students received are presented in Table 7. According to this table, when the first step, definition, was reviewed, it was concluded that one group defined media literacy properly, and determined the problems and factors affecting it, with examples about them. Six groups defined media literacy, determined the problems and factors affecting it but did not present examples.

Table 7: *Students' Points for WebQuest Assignment Themed Media Literacy*

		n	Low	Medium	High	Points
			1	2	3	
1st step	Definition	7	0	6	1	15
2nd step	Internet research and analysis	7	5	1	1	10
3rd step	Interpretation	7	5	1	1	10
4th step	Recommendations on the subject	7	4	2	1	11
5th step	Reporting and Presentation	7	5	1	1	10
Between 7 and 11,6 points low; between 11,7and 16,3 points medium; between 16,4 and 21 points high level						

Studying the second step "Internet research and analysis" revealed that one group did internet research and analyzed the comments made on the news about the subject and interpreted the society's points of view about the subject. One group did internet research but did not analyze the comments on the news. Five groups' internet research on the subject was inadequate, and there was no analysis.

When the third step, "interpretation", was reviewed, it was seen that one group interpreted the media events properly; one group made an inadequate interpretation; five groups did not make any interpretations about the media news.

When the fourth step, "recommendations on the subject", was reviewed, it was found that one group made adequate recommendations with their reasons. Two groups made recommendations to the subject but did not present the reasons for the recommendations. Four groups made inadequate recommendations with no reasons presented.

The fifth step was "Reporting and Presentation". In this step, one group did the task. They cited the references they used and reflected the content of the subject properly. One group made citations properly but did not reflect the content completely. Five groups did not cite the references and did not reflect the content of the subject completely.

When the total points of the groups for the WebQuest assignment were reviewed, it was found that students were best at defining, but the least successful in internet research and analysis steps. It was further concluded that group performances were medium in the definition step but low in all other steps.

The students' total points for WebQuest homework about "Class Constitution" as part of democracy are shown in Table 8. As mentioned earlier, a separate rubric was used to evaluate the WebQuest assignment "Class Constitution." There were five steps of evaluation. Eight student groups prepared homework on this subject. The students' points were calculated via the rubric and are presented in Table 8.

The first step of evaluation was "Reading Resources." When the groups' homework was reviewed, it was found that one group read and understood the resources. Two groups read the resources but did not understand the subject. Five groups failed to read and understand the resources.

Table 8: *Students' Points for WebQuest Assignment Themed Democracy*

		n	Low	Medium	High	Total Points
			1	2	3	
1st step	Reading References	8	5	2	1	12
2nd step	Rights and Responsibilities	8	5	2	1	12
3rd step	Minority Rights	8	5	2	1	12
4th step	Essential Rules	8	5	2	1	12
5th step	Essential Foundations	8	5	2	1	12
Between 8 and 13 points low; between 14 and 19 points medium; between 20 and 24 points high level						

The second step of evaluation was "Rights and Responsibilities." When the groups' homework was reviewed, in this step, five groups did not mention any rights and responsibilities. Two groups mentioned some rights and responsibilities. One group mentioned rights and responsibilities at a satisfactory level.

The third step of evaluation was "Minority Rights." When the groups' homework was reviewed, it was found that five groups did not mention any minority rights. Two groups mentioned some minority rights. One group did mention minority rights at a satisfactory level.

The fourth step of evaluation was "Essential Rules." When this step was reviewed, it was seen that five groups did not mention the essential rules. Two groups partly mentioned them. One group did this homework properly. The last step of evaluation was about "Essential Foundations." The review revealed that only one group mentioned essential foundations. Two groups partly mentioned them whereas five groups did not mention them at all.

The total points that the groups received for class constitution WebQuest were rated via the rubric. It was concluded that group performances in this WebQuest homework were low in all steps. It was further concluded that the groups could not fulfil the task on the class constitution subject. This means that the students failed to learn the subject properly.

CONCLUSION AND DISCUSSION
An overall review of the groups' assignments on "Globalization, Internet and Culture, Peace and Violence, Violence against Women, Media Literacy, and Class Constitution", helps conclude that the students performed

best at the definition step. The teacher candidates' overall scores from each WebQuest were either low or medium. They hardly ever scored at a high level in any of the WebQuests. Reaching medium and high levels requires teacher candidates to have a higher order thinking skills. The findings suggest that they either lack those skills or did not produce any work representative of those skills. This may be interpreted as students having had difficulty in reaching a higher order of thinking skills for analysis, synthesis, evaluation, and making conclusions (Halat, 2005/2007), which were all WebQuest homework objectives. In their research on teachers' high cognitive thinking levels and their abilities to use technology, Polly & Ausband (2009) conclude that, although WebQuest applications enable them to use technology, there appears a decrease in their high level cognitive thinking skills.

Teachers' low ability to do internet research, low performance in analyzing and interpreting data can be attributed to their inexperience resulting in low thinking level scores. In research carried out on teacher candidates, similar results are reported suggesting lower thinking abilities (Apaydın & Çelik, 2010; Beşoluk & Önder, 2010; Argon & Selvi, 2011, Şen, 2009; Gülveren, 2007).

At the end of the WebQuest applications, it is concluded that in order to prepare WebQuest homework properly it is necessary to develop prospective teachers' high level thinking skills such as citing references, using the data effectively, interpretation, analysis, synthesis, and evaluation. In this context, in higher education 'project based education', 'group work', and 'collective learning' techniques can be developed as part of the constructivist approach (Dam & Volman, 2004). It is suggested that in order to make active learning happen (Halat, 2005 &2007), WebQuest applications projects based on teaching and discussion techniques must be in place in teacher training programmes.

The medium level score, very common among groups of teacher candidates in all WebQuests applications, calls for support for prospective teachers in utilizing WebQuests. Low scores can be due to the fact that the current candidates were not familiar with such applications as WebQuest in their own education. The new generations of teacher candidates in the future will be digital natives. Their ability to use ICTs will be very high. What teacher trainers need is to incorporate WebQuests in their teaching practice with the intention to improve teacher candidates' understanding of a particular subject. However, they should also find ways of improving students' generic skills of research, critical thinking, evaluation and working with others regardless of classes utilizing technological devices and applications.

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