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Message from the Editor-in-Chief

TOJET welcomes you. TOJET looks for academic articles on the issues 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 discuss the perspectives of students, teachers, school administrators and communities. TOJET contributes to the development of both theory and practice in the field of educational technology. TOJET accepts academically robust papers, topical articles and case studies that contribute to the area of research in educational technology.

The aim of TOJET is to help students, teachers, school administrators and communities better understand how to use technology for learning and teaching activities. The submitted articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJET. TOJET provides perspectives on topics relevant to the study, implementation and management of learning with technology.

This journal was initiated in October 2002 to share knowledge with researchers, innovators, practitioners and administrators of education. We are delighted that more than 25000 researchers, practitioners, administrators, educators, teachers, parents, and students from around the world had visited the twenty first issue between October 01 and December 31 2007. It means that TOJET has diffused successfully new developments on educational technology around the world. We hope that this volume seven issue one will also successfully accomplish our global educational goal.

I am always honored to be the editor in chief of TOJET. Many persons gave their valuable contributions for this issue. I would like to thank the guest editor and the editorial board of this issue.

TOJET, Anadolu University, Near East University, Eastern Mediterranean University, Sakarya University, Governor State University, Ohio University, and Louisiana State University will organize the Eight International Educational Technology Conference (IETC 2008) in May 2008 in Eskişehir - Turkey. TOJET also supports Ege University to organize The Second International Computer and Instructional Technology Conference between April 16-18, 2008 in Kuşadası, Izmir - Turkey (http://egitim.ege.edu.tr/bots/).

The guest editor of this issue is Assist. Prof. Dr. Hamit Caner. TOJET thanks the guest editor and the editorial board of this issue: Prof.Dr. Ahmet Konrot, Prof.Dr. Aytekin İşman, Prof.Dr. Bekir Özer, Prof.Dr. Elvan Yılmaz, Prof.Dr. Sabri Koç, Prof.Dr. Ülker Vancı Osam, Assoc.Prof.Dr. Gülşen Musayeva Vefalı, Assoc.Prof.Dr. Hüseyin Uzunboylu, Assoc.Prof.Dr. Mesude Atay, Assoc.Prof.Dr. Necdet Osam, Assoc.Prof.Dr. Osman Yılmaz, Assoc.Prof.Dr. Zeki Bayram, Assist.Prof.Dr. Ali Sıdkı Ağazade, Assist.Prof.Dr. Ekrem Varoğlu, Assist.Prof.Dr. Fatoş Erozan, Assist.Prof.Dr. Hamit Caner, Assist.Prof.Dr. Hasan Özder, Assist.Prof.Dr. Hatice Nilay Hasipoğlu, Assist.Prof.Dr. Mustafa İlkan, Assist.Prof.Dr. Osman Cankoy, Assist.Prof.Dr. Süheyla Üçışık Erbilen, Dr. İlkay Gilanlıoğlu and Dr. Nadire Çavuş

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EVOLVING ROLES OF ONLINE AND FACE-TO-FACE INSTRUCTORS IN A LECTURE/LAB HYBRID COURSE

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ABSTRACT
Although lecture and lab courses are commonly used in higher education, there are potential problems with this format. However, technology is presenting new opportunities for teaching such a type of a course. This study explores the changes in the role of the instructors when a lecture and lab course evolved into a hybrid course, with the lecture portion of a course online and the labs kept face-to-face. As revealed through the use of discourse analysis, the roles of the instructors were transformed from teacher-centered to student-centered, low-interactor to high-interactor, and low-initiator to high-initiator. There was also an obvious merging or synthesis of the roles of the lecture and lab instructors, particularly in the areas of course administration, subject matter expertise, and face of the course.

INTRODUCTION

In higher education, teaching in a lab/lecture format is common (Perkins, 2005). These courses often consist of one lecturer, generally the expert, in a single large, lecture hall. The courses are complemented by multiple, small-group labs, often taught by adjunct faculty or graduate students. A second scenario is small group lectures (often by one or more instructors) accompanied by similar small group labs. There are potential problems with these formats. Large group lectures tend to lack multiple opportunities for instructor-student interaction, while small group lectures many times require more instructors than are available.

However, the advent of online learning has facilitated a new scenario for these lab/lecture formats. As suggested by current research (Angeli et al., 1998; Bonk and Wisher, 2000; Stephenson, 2001; Zheng & Smaldino, 2003; Murihead, 2000), online instruction varies in comparison to face-to-face instruction, which necessitates a re-evaluation of the online instructor's role. Changing from conventional means of instruction to online methods of teaching can often produce extraordinary modifications in the perceptions of teachers (Dringus, 2000). Some of the challenges and barriers for online learning that have been identified by researchers are the change of roles and responsibilities for instructors (Yang & Cornelious, 2004). Moreover, the changing roles of the teacher have required a change in pedagogies for the higher education lecturer (Yang & Cornelious, 2004).

There is very little research that examines the roles of the lecture and lab instructors when the lecture has gone online and the labs remain face-to-face. The focus of this study is to explore the changes in the roles of the instructors in this new hybrid environment. Due to the nature of the research question surrounding the changing roles and identities of the instructors, the identities and roles building task was selected as a focal point of my discourse analysis. This building task looks at how we use language to get recognized as taking on a particular identity or role (Gee, 2005). It attempts to ask and answer the following research questions for this study:

1. What identities or roles with their personal, social, and cultural knowledge and beliefs, feelings, and values, seem to be relevant to, taken for granted in, or under construction in this situation where the lecture was moved online?
2. How are these identities or roles stabilized or transformed in this situation?
In terms of identities and relationships, what Discourses are relevant (and
irrelevant) in the situation? How are they made relevant (and irrelevant), and in what ways?

METHOD

Context. This study examined a course entitled, 'Introduction to Educational Technology.' The course had been traditionally offered in a lecture/lab format through a large College of Education in the United States. Introduction to Educational Technology is an introduction to computer productivity, multi-media,

communications, educational software, interactive media, reference, instructional applications, and ethical, legal and social issues course. It is the main educational technology course that a student takes prior to their application to the Teacher Education program; it is, therefore, critical that it be designed to inform, educate, and encourage students who are considering or might consider teaching as a career choice. This course has also been designed to meet the needs of future educators in applying technology within educational settings. As a result, students leaving the class should be able to demonstrate a sound understanding of technology operations and concepts; apply technology effectively to learning environments; explain methods and strategies for integrating technology to maximize student learning; apply technology to a variety of assessment and evaluation strategies; use technology to enhance professional productivity; and develop an understanding of the social, ethical, legal, and human issues surrounding the use of technology in education.

Data Collection. Data was collected from Samantha and Brian, graduate student instructors of the Introduction to Educational Technology course. Data on Samantha and Brian was from their observations of the course structure, students, and other instructors, researcher memos, and semi-structured interviews. Interviews were digitally recorded and were transcribed by a third party vendor. Questions asked in the interview were the following, however, additional questions were asked depending on the flow of the interview:

1. Why not do both lab and lecture online? In other words, why split it with the lecture online and the lab still face-to-face?
2. How have the roles of the lab and lecture instructors changed since the lecture went online?
3. How are these roles similar to when the lecture was face-to-face?
4. I'm going to list a few roles, and I want you to discuss whether or not you see them as being part of the lab or lecturer's role, and how they have changed since the lecture went online:

a. Content expert (SME)
b. Speaker
c. Formal interactor
d. Informal interactor
e. Tutor
f. Proctor
g. Course Administrator
h. Facilitator and guide
i. Face of the course

5. What do you see as the positive changes to the role of the instructors? Why?
6. What do you see as the negative changes to the role of the instructors? Why?
7. What changes to the roles of the instructors would you make? Why?
8. What implications do you see this change in going online will have for future instructors? (training change, time commitment of instructors, etc.)
9. What future do you see for EME2040? How will it change? What will stay the same? Why?
10. Did students learn better and more deeply than when the lecture was face-to-face? Why or why not?

Observations were collected on large group lectures and labs taught by Samantha and Brian. Observations were made at the beginning, middle, and end of the course for each instructor.

Data Analysis. A large amount of data was collected (3 hour interviews with each instructor, 15 weekly class observations and memos from each instructor, and researcher memos that continued throughout data collection and analysis. The first step in the analysis was to take this large body of information and attempt to find the macrostructure (Gee, 2005). Gee argues that sizeable chunks of data have distinguishing ingredients and suggests the process of breaking down the data into these larger structures in order to help determine meaning. The interview and observational data were analyzed by applying this technique to all the data available for each instructor. For Samantha and Brian, this analysis process resulted in a story structure that roughly followed the flow of questions (see list of questions above).

Data was collected and analysis conducted using a constructionist theoretical orientation in order to reveal the ways in which groups take part in the creation of their reality. Of particular interest were the instructors' creation and transformation of their specific roles in an ongoing, organic process of acting on their interpretations and past knowledge and experiences. Gee's discourse analysis (2005) was applied to the unstructured interviews, observations, and researcher memos. This type of analysis was used to help consider how the language used by the instructors enacts social and cultural perspectives and identities (Gee, 2005).

Delimitations. This study involved findings based on instructor experiences in a course where the lab was face-to-face and the lecture was online. The context of this case study needs to be taken into consideration to make

transferability judgments. Lincoln and Guba (1985) explained transferability as the extent to which findings can be applied in other contexts or with other respondents. They suggest that the researcher can provide for transferability judgments possible on the part of those applying. One way this can be achieved is by providing rich, thick descriptions that will help others interested in making these applications to reach a decision about whether such application can occur. In this study, rich, thick descriptions were provided to enable the readers to make transferability judgments to potential applicable contexts.

RESULTS

Large group lecture component. Traditionally, Introduction to Educational Technology has been taught in a large group lecture, small group labs format. The large group lecture consisted of approximately 180 – 250 students meeting twice a week for fifty minutes in a lecture hall classroom. The classroom was equipped with older style wooden stadium seating in a bowl-shaped room which focused downwards towards the floor. Sound and computer overhead technology was also present. Students spread out across approximately 400 seats in preference groups, with the majority of students sitting at the top of the bowl (furthest away from the instructor). Students would take notes on the lecture and occasionally take part in small group discussion activities. Reading and other assignments based on the lecture and textbook were given at the end of a class session and collected at the beginning of the next. Assessments were given in the form of a midterm, final project, and comprehensive final exam. The instructor, Samantha, either taught from the podium or moved back and forth across the stage. The instructional method that she primarily used was direct instruction accompanied by a computer generated slide show presentation. This was due mainly to the size of the class. As a result, Samantha was more teacher-centered than student-centered in her teaching practices. Constrained by the instructional method and the size of the class, she behaved and taught as if she was the subject-matter expert (one who has demonstrated competency and mastery in a particular subject or topic) and was there to communicate knowledge to the student. As a result, this pushed the student into the role of a passive receptor of knowledge and placed Samantha in an increasing position of power in relation to her students – she was in possession of controlling influence.

Samantha also primarily interacted with her students through regulated interaction. Most sociologists define regulated interaction as planned and regulated sequences of social actions between individuals (or groups) who modify their actions and reactions due to the actions by their interaction partner(s) (Wikipedia, 2006). These social actions may occur in a workplace, family, or any other environment. Samantha's interaction time with students consisted of two hours and forty minutes per week, which was two 50 minute lectures and one office hour. She was also available to meet students one-on-one immediately prior to and after each lecture class, by appointment, and via email. She gave a lecture while students listened. She answered student questions during a specified question and answer period. She did not interact with students in accidental, repeated or regular ways during the lecture period (other socially defined ways of interaction). During office hours Samantha assumed the role of a regulated and regular interactor with students. Sometimes these meetings were planned, as a student had set up an appointment. However, most of the time these meetings were unplanned, but still very common occurrences where she would most likely interact with students. With that said, her office hours were sparsely attended by less than 5% of students. Moreover, she thought that both the large auditorium physical facilities and the lecture method seemed to lend themselves more to regulated interaction. According to Samantha, this imbalance in the favor of regulated interaction seemed to be a barrier to learning for her students.

In this environment, Samantha also initiated with her students very little. According to Webster's Online Dictionary (retrieved from http://www.websters-online-dictionary.org/definition/initiate on April 25, 2007), initiate means, "to begin or set going; make a beginning of; perform or facilitate the first actions, steps, or stages of; establish as an institution, custom, or trend". The lecture contained very few opportunities for Samantha to initiate with her students as most of her time was spent speaking. Initiation by Samantha consisted of a) her one weekly office hour (although this was spent waiting for students to come to her for help) and b) approximately twelve hours of written assessment feedback for the entire course. The result of this was that the student was left with the responsibility of listening to and processing the information in her lectures, coming to her office hour or making an appointment to get help, and asking any other pertinent questions.

Beginning the summer of 2005, the large group lecture was shifted to an online format. The physical environment of the lecture hall was replaced by an online learning management system that was built on the principles of social constructivism (Dougiamas & Taylor, 2003). Instead of meeting twice a week during set class times, students interacted with Samantha and her already prepared content in an asynchronous format. The curriculum was no longer delivered primarily through direct instruction. Additionally, the textbook was replaced by a series of relevant web-based articles. Students read web-based articles, took electronic surveys which gave immediate feedback, viewed flash presentations with audio, and interacted with each other and Samantha via forums. Students accessed the online learning environment at their convenience, completing assignments on a

weekly basis. Assessments were revised to reflect the new environment, exchanging the midterm for five quizzes – regularly spaced to provide quicker feedback, eliminating the final exam, and adding weekly writing assignments to increase student reflection on the current topic being studied.

After the shift of the lecture to an online format, Samantha's role as a teacher-centered purveyor and distributor of content underwent a transformation into that of a student-centered facilitator. The following excerpt illustrates this shift:

(After the lecture went online) "I (Samantha) had this conversation with this girl who, I mean it was beautiful. This is what should happen in teaching. She was like "Well, you know, I'm from the psych department. And when you ask this question in this way, I had interpreted it in this way because of my prior knowledge". And I said "Yes, you know, I understand that, but now looking at it within this educational framework and seeing this connections being made to these other elements, can you kind of?" And "Ah yes". You know, kind of facilitating that kind of reason, kind of helping them make the connections."

This shift in Samantha's role seemed to occur for several reasons. First, as an online instructor, the curricular content was already prepared before the course began. As a result, instead of spending time lecturing and preparing lectures, she was able to spend time facilitating students' understanding of the content, supporting them in their learning. Part of this transformation was that she changed from being a distributor of content to being a guide of the content. In fact, she described her experience as going from being "…only a content distributor to being a teacher." This allowed her to be more student-centered in her instruction (references to this shift were counted as 49 individual occurrences in the interview transcripts). Second, as lecturer, Samantha's role seemed to be transformed by the move of the course to the online environment, geographically separating the content from the instructor and giving her the opportunity to change her teaching practices

Moreover, the online environment placed different constraints on her than in the face-to-face lecture environment. In an online environment she had to be more specific and numerous with communication since her students were not physically present. This increased communication from Samantha spawned a boost in the amount of accidental and regulated dialogue with students, as well as an increase in the same kinds of negotiated learning with students (see figure 1). Empowered by this opportunity, Samantha applied her already present constructionist orientation and constructivist methodologies to transform her role into that of a student-centered facilitator. She thus became much more involved in scaffolding student knowledge, providing remedial and advanced help, and guiding students' to construct new knowledge.

The beliefs, feelings, and values of Samantha as a lecture instructor helped in this role transformation. According to interview and observation transcripts, Samantha passionately believed that active learning gets better results than passive learning (five separate occurrences). She also valued facilitation of student's learning, learning with the student, and helping students connect new knowledge to past knowledge and experiences over being a teacher-centered purveyor and distributor of content (seven separate occurrences). Her past experiences and convictions seemed to underlay her belief that a good instructor is much more than a content distributor and should strive to teach her students in a student-centered manner. Samantha firmly believed that teaching is characterized by facilitation of student learning, and a good instructor interacts a lot with her students. She believed that facilitation is a better instructional model to follow than a teacher-centered one, that it supports students in their learning better than a teacher-centered model, and that in facilitation, an instructor learns alongside her students.

When the lecture went online, there was a transformation in Samantha's interaction with students, best described in the following excerpt:

"…that whole feedback process is something that has been added to the communication. Before students didn't really ask me for feedback except for the final project of the course, which is the lesson plan. I mean, now I have students who have consistently asked me for every assignment to give them some type of feedback. Lots of questions clarifying knowledge, or information confusion. Yeah, but it definitely has gotten more personal. You know, after I had a student come into my office she e-mailed me with her personal web site and wanted me to take a look at it and, you know, give my opinion. You know, students who had read my bio in my research area had e-mailed me about what I am doing in video games. They had read I had done travel over the summer, and asked me where I went and stuff like that."

The change to an online environment seemed to shift the interaction level from regulated towards regular, repeated, and accidental interaction (see figure 1). Whereas students seemed to reserve their few questions for

the face-to-face lecture time, in the online environment their questions seemed to multiply, even to the point of asking Samantha for opinions on projects that were outside of the scope of the course. This particularly seemed to increase her accidental – unplanned and likely not repeated – interaction with students. Students also asked her for more and better feedback on assessments, and were more concerned with the quality of their work. This resulted in more regular interaction – unplanned but very common – interaction with her students around the online structure of the course and course assignments.

Samantha compared this kind of interaction to when she taught the face-to-face lecture, where students only requested feedback on the final assignment, while online the students requested feedback on all assignments. This increase in accidental and regular interaction with her students had the effect of increasing the personal relationship between Samantha and her students. Examples that she gave of this are that one student asked for feedback on a personal website, and others asked questions about her online autobiography. These types of interaction also had an upward spiraling effect on Samantha. Interview transcripts reveal that as students opened up and interacted with her in these ways that in turn encouraged her to be even more willing to build personal relationships with her students and to desire to be more accessible and reliable. Samantha's beliefs, feelings, and values helped in this role transformation from regulated interaction to more regular and accidental interaction. She had already believed that the multiplication of teacher-student interactions would increase student learning, and valued the connections with past knowledge and experiences that would take place in an environment that encouraged this. The online environment seemed to both provide the structure for increased accidental and regular interaction as well as release her from the constraints of the face-to-face environment that had kept her from interacting accidentally and regularly with her students. By going online, Samantha increased these kinds of interaction, which she valued as a tool to increasing student learning (see Figure 1).

Samantha	Time spent in accidental interaction	Time spent in regular interaction	Time spent in regulated interaction
Face-to-face lecture instructor	0	16	48
Online lecture instructor	79	158	7

Figure 1: Time (in hours per course) spent in different types of interaction between instructor and students, face-to-face and online

When the lecture went online, Samantha's role as an initiator greatly increased, which is best exemplified in the following interview excerpt:
Samantha: "I think that there has definitely been a shift. I think it has been a good shift, though. I think the lecturer has had to take, believe it or not, more of an active kind of preemptive attitude with the class because it is easier to read people when you are giving a lecture by looking at their faces and body language.

Interviewer: Even with the 200 people?

Samantha: Exactly, you know. But online you can't get that feeling unless you are going to the discussion boards and putting out calls to contact me. You know, you have to be so much more rigorous with the grading and, you know, grade things as soon as they come in."

Observation data shows that instructor-initiated feedback on assessments increased to 5-10 hours a week, or approximately 180 hours per semester (see Figure 1). In addition, the amount of time Samantha spent replying to student's questions via email and her collaboration time with the lab instructor also increased significantly. She seemed almost forced to take on an active, preemptive attitude, being involved by reading student postings on the online discussion boards, initiating with students on the discussion boards, and providing more and quicker feedback on assignments. Samantha's beliefs and feelings, and values seemed to help in this transformation to high initiator (see Figure 2). She had already believed and was passionate about the idea that initiating is better than being passive and that a true instructor/initiator supports students through consistent initiation. As a result, through the move to the online environment, her beliefs, feelings, and values about initiation were empowered to be more fully expressed than in the face-to-face lecture environment.

	Time spent in instructor feedback on assessments	Time spent in email communications with students	Time spent in planning and collaborating with lab instructor
Face-to-face lecture	16	5	2
Online lecture	80-160	20	20

Figure 2: Time (in hours per course) spent in instructor initiation with students, face-to-face and online

Small group lab component. Traditionally, each small group lab held approximately twenty students and met once a week in a university-provided computer lab containing Macintosh G5 computers. The room was also equipped with an instructor's computer that provided sound, video, and computer projection technology. Students sat in seven rows of computers which were perpendicular to the front of the room and the projection screen. The labs were taught according to the instructor's preference. Some instructors provided guided, step-by-step instruction through the use of pre-set software tutorials, while others allowed students to work independently while providing one-on-one support. After a particular software program was introduced, students would first complete a pre-set tutorial on the software consisting of step-by-step instructions. This tutorial would then be followed by a student-generated project using the same software. Students would be assessed based on technical proficiencies in each software package and on how well their project fit into an educational environment.

Participation was also assessed based on student lab attendance. One of the lab instructors, Brian, functioned in the role of a facilitator. He spent most of his time during class in either one-on-one or small group facilitation of knowledge. As a facilitator, Brian came along side individual and small groups of students and helped them to understand new knowledge and skills based on their past experiences and knowledge. As a result, most of his instruction was student-centered as opposed to teacher-centered. Constrained by the instructional method and his own beliefs about teaching and learning, he behaved and taught from a student-centered, constructivist perspective. As a result, this pushed the student into the role of a co-constructor of knowledge and placed Brian in a more equal position of power in relation to his students – he was in possession of controlling influence, but was also a co-learner and co-constructor alongside his students. He was available to meet students one-on-one immediately prior to and after each lab class, during three weekly office hours, by appointment, and via numerous email communications.

Before the lecture went online, Brian interacted with his students in a very accidental way. As he passed by the computer lab, he would often see his students working on an assignment and stop by to see how they were doing. Even if he saw a student eating lunch in the union building he would approach them and ask how they were doing. Also, he would also send out an email to remind his students of when his office hours were and when particular assignments were due. During class and office hours, he interacted more regularly with students, providing verbal and written feedback on assignments, and tutoring students one-on-one and in small groups. His only regulated interaction with students was when he planned short lectures or small group activities for the lab.

Brian was also a frequent initiator with students. He regularly initiated with students to discuss lab activities and projects, both inside and outside of class. In class he initiated with students through frequent question and answer times, providing easy to understand feedback and grading, and stopping by random students and asking how they were doing. Outside of class, he used email, impromptu visits with students when he saw them in the computer lab or elsewhere, and office hours to initiate with his students. This high level of initiation led students to perceive him as readily willing and available to help when they needed him.

When the large group lecture was shifted to an online format, the small group labs were left in their same format. The lab sections met in the same physical environment described above. However, changes to the lecture cascaded into the labs, forcing changes there as well. After the lecture went online, the lab instructor was the only face-to-face instructor with whom the students interacted, and this interaction increased in quantity, type, and geographic location. If a student wanted to talk to their instructor about an issue, they met with Brian, which led to a huge increase in the quantity of his interaction with students. This is despite the fact that Samantha was still available to meet in face-to-face office hours. Also, the type or breadth of issues handled by Brian increased to include lecture, as well as lab-related matters. Finally, his interaction with students increased in many locations – before, during, and after class, as well as during office hours. During class, Brian took on a larger role as content distributor, which increased his interaction with students. Interestingly, this seemed to increase student confidence in communicating with Brian, resulting in an increasing position of power in relation to his students – he was in possession of more controlling influence with his students. (The increase in the types of interaction with Brian, regular and regulated, demonstrated this increase in power. This is because interactions over issues of assessment, homework, projects, grades, etc. were present only after the shift to an online lecture. See Figure 3.)

Brian	Time spent in accidental interaction	Time spent in regular interaction	Time spent in regulated interaction
Face-to-face lab instructor	32	83	16
Online lab instructor	56	50	32

Figure 3: Time (in hours per course) spent in different types of interaction between instructor and students, face-to-face and online

Much of the types of interaction that Brian had were through one-on-one or small group tutoring, and this was unchanged through the move of the lecture online. He still had many opportunities in and out of class to accidentally and regularly interact with his students. However, when the lecture went online, there seemed to be a cascade effect that spilled over into the lab environment, increasing the amount of regulated interactions he had with students. Brian found that he had increased responsibilities in course administration and proctoring online assessments, which required more regulated interaction with students. The net result of this was less time during class for accidental and regular interaction between him and his students. This seemed to result in increased student use of Brian's office hours, as well as increased email interaction, in order to offset the loss of the accidental and regular interaction time. Brian's values, beliefs, and feelings were counter to those that underlie regulated interaction. As a result, he reported feeling torn between "teaching" students and communicating necessary information. However, he also felt that the move online would better the course overall, so he was willing to make the necessary changes to his instruction.

Brian's initiations with his students also continued after the lecture went online. However, his role as initiator was now transformed through the addition of added responsibilities. Prior to the course going online, he had no responsibilities in course administration and proctoring of online assessments. However, now he found himself deluged with a large amount of verbal and electronic communication from students regarding both of these areas. Further, after he answer students' initial questions, more questions on other non-lab oriented activities began to fill up his voicemail, email inbox, and class time. Interview transcripts revealed thirty seven separate references to increased administration, proctoring of online assessments, email, and face-to-face questions.

For example, "…when the class ends I always have students coming up and ask one question about this or that… they might ask us a question about when it's going to be graded or when will the answers be on the web and things like that… which makes the instructor need more time to answer those individual questions."

All of these emails, questions, and increased responsibilities led to an increased amount of time that he needed to initiate with students on these areas. He initiated regular email communication regarding upcoming online assessments. In class, he set aside time at the beginning or end to share announcements concerning these assessments, as well as any other course administrative announcements. He also devoted an entire lab class to the introduction to the online learning environment software. As a result of all these things, Brian's role as initiator greatly increased.

Synthesis of roles: Lecture and lab instructor roles merging? A curious synthesis of the two previously exclusive roles of lab instructor (Brian) and lecturer (Samantha) also took place when the lecture went online. Prior to the lecture going online, most responsibilities and roles were divided between instructors of the lecture and lab portions of the course. Responsibility for explaining and assessing lab assignments and training and tutoring students in software capabilities belonged to Brian and Samantha was not involved at all. Delivering lectures, proctoring midterm and final exams, and grading lecture projects were the sole province of Samantha. However, after the shift of the lecture online there seemed to begin a merging of Brian and Samantha's roles, as illustrated by the following interview excerpt:

Samantha: "I mean, like I said we have kind of had this flow of stuff between both of the roles, between lecturer and lab instructor, and I think both of us have taken on additional responsibilities that maybe we didn't have before. But, you know, I think it has made the class a stronger class."

The realm of course administration used to be the responsibility of the lecture instructor. After the lecture went online, Samantha still retained the majority of responsibility in this area. However, Brian also took on the course administrative responsibilities of course announcements, proctoring of online assessments, and participation in the planning and implementation of the course. The merging responsibilities seemed to be encouraged by the move of the lecture to an online environment, a good professional relationship between Samantha and Brian, a common goal and focus, and their dual commitment to excellence. These elements helped Samantha and Brian's mentality to shift from that of a "lone ranger" instructor to that of team instruction.

Another area that seemed to merge for Brian and Samantha was that of expertise of subject matter content. When the lecture was face-to-face, the instructors exercised expertise over their instructional domain. The lecture instructor was the subject matter expert (SME) of educational technology in the classroom, educational theory and software, productivity software, Internet safety, web resources, preparing content for delivery, online evaluation and assessment, digital technologies, distance education, and the digital divide. On the other hand, the lab instructor was SME of all of the software packages used (Microsoft PowerPoint, Microsoft Excel, Inspiration, Adobe Dreamweaver, Adobe PhotoShop, iMovie), operating systems (PC and Mac) and individual tutoring skills. However, with the shift of the lecture to an online environment these subject matter expertises merged. Students began to ask more questions about the lab to the lecture instructor and vice versa, leading both Samantha and Brian to become more of a SME of each others' materials. Samantha and Brian's beliefs, feelings and values acted to support this synthesis. They firmly believed that being an expert of any domain is relative, and that the important thing was that they know a little more than their students.

Brian said, "I think that the instructor needs to be as knowledgeable as possible. I really don't like the word expert, because in my personal belief nobody is the expert of anything… We know as much as we can. Things change so much, especially in technology and in the integration of technology that the word expert is like a big hat for anybody."

Samantha said, "You know, they (lab instructors) have had to become more of a content expert what the course is covering, and they have gotten more lectures. So I think it has developed more of a synthesis of the roles."

This attitude toward being an subject matter expert helped Samantha and Brian as they were growing in their own knowledge of the others' domain – they didn't feel like they had to have everything mastered in order to teach some of it effectively. They also believed that subject matter expertise was only useful if they could effectively use it to help make connections between students' past knowledge and experiences and the subject matter. Also, application of content, not just content for the sake of content, was highly valued by Samantha and Brian. This belief and value helped them to bridge the gap between lab and lecture, helping students to see many connections that would have otherwise gone unseen. Their beliefs and values helped to drive the synthesis of these roles. These attitudes toward being a subject matter expert were referenced sixteen times in the transcripts.

A final area of merging of the instructors' roles was that of the "face" of the course. This role is defined by the researcher as the individual who, in the eyes of the student, becomes synonymous with the course. Prior to the move of the lecture to an online environment, students referred to the course as being taught by the lecture instructor, and frequently referred to the course as "Samantha's course." Students would often ask lab-related questions to Samantha and acted as if she was the final authority for the course in terms of grading, dealing with student issues, etc. However, this changed after the lecture went online. Brian became more synonymous with the course. This was evident from multiple observations of students' informal conversations, referring to, "Introduction to Educational Technology…. my instructor is Brian," without any reference to Samantha, and that students sought out Samantha much less for lab-related questions. In other words, the "face" role became more evenly divided between the lab and lecture instructors. Physical sight of an instructor increased the "face" role for Brian, and lack of physical presence acted to decrease the "face" role for Samantha. However, Samantha learned that her "face" role could be maintained or increased through increased informal online communication and feedback – resulting in increased personal relationships with students. Brian learned that he could increase his "face" role by teaching the lab skills within the framework of the lecture content, thus helping students to connect the lecture theory to the technical lab skills.

The role changes discovered above are all confirmed in the literature focused on courses that make a complete shift to an online format. First, one of the primary instructor role changes when a course goes online is the change from the role of a teacher-centered purveyor of knowledge to that of a student-centered facilitator. It is widely suggested that online instruction is a good format for student-centered facilitation (Volery, 2000; Webster and Hackley, 1997; Wu & Hiltz, 2004; Yang & Cornelious, 2004). Ascough (2003) argues that this is due to the lessening of control over the class that the instructor experiences in an online environment. Also, as Knowlton (2000) has suggested, online education involves the instructor and students together as a community of learners. The instructor serves in the facilitator roles of coach, counselor and mentor of the students. According to Maor (2003), facilitator is perhaps the most challenging role of the online teacher. It is considered the most difficult role because the instructor has to constantly evaluate the process of peer interactions, select and filter information for student consideration, provide thought-provoking questions, and facilitate well-considered discussion (Kettner-Polley, 1999; Maor, 2003).

Another primary role change defined in the literature was the change from a low-level interactor to that of a high-level interactor. Volery (2000) suggested that the role of the online instructor changes because the level of interaction has changed in online delivery. According to current research, the provision of instructional and emotional support to students (Muirhead, 2000), and an increase in social interaction and focused communication (Bonk *et al*., 2001; Kanuka & Anderson, 1998; McAlpine, 2000; Moallem, 2001; Murphy & Cifuentes, 2001; Oliver, 2000; Saba, 2000) contribute to this increase in the level of instructor interaction. Social interaction is sustained by constant communication that uses many different forms. Focused communication necessitates the online instructor's facility to supply detailed and regular information about course goals and objectives, assignments, and expectations. This would include providing feedback and instruction, probing, asking questions, stimulating the discussion, synthesizing students' comments, and referring to outside resources or experts in the field. Focused communication from the instructor supports students' learning and encourages student interaction. This works to change the instructor's role from a low level interactor to that of a high level interactor.

A third role change is the change from a low-level initiator to that of a high-level initiator. In online instruction, faculty initiate contact with students through features such as e-mail, online office hours, and synchronous chat rooms (Gueldenzoph, 2003). To be a high level initiator, communication must involve more than mass e-mail messages to the entire class. Individual, reflective e-mail to each student should be maintained on a regular basis. Additionally, a high level initiator role carries with it increased responsibilities in management and administration. Maor (2003) confirms this when she talks about her, "…managerial role… co-ordinating the unit, intervening during the semester to keep the momentum of discussion going and frequently e-mailing individual students" (Maor, 2003, p. 133). This role seemed to go beyond mere administration into the realm of instructional design (Zheng & Smaldino, 2003), co-ordinating the unit and overseeing tasks, course structure and requirements (Vonderwell & Turner, 2005).

IMPLICATIONS

Emerging Discourses. According to Gee (2005), Discourse occurs when language and non-language are merged to enact specific identities. In other words, people use language and ways of interacting, feeling, believing, valuing, and using various sorts of objects, symbols, tools, and technologies to recognize themselves and others as meaning and meaningful in certain ways. These uses of language and non-language create Discourses. Two discourses seemed to emerge from the data as relevant in this situation: the Discourse of being a good instructor, and the Discourse of technological change.

The Discourse of being a good instructor was first evident in the language used by Samantha and Brian. Terminology like student-centered, focus on the students, choice for students, interaction, active, social constructionist, constructivist, guide, facilitator, connecting new knowledge with previous knowledge and experiences, initiator, team player and co-constructor of knowledge were used approximately 190 times in the interviews to create an identity of a good instructor. Based on these references, both Samantha and Brian viewed the actions of a good instructor as quality communications with students while assessing students' learning through the use of real-world, authentic assessments. Their interactions were more informal; with students as a guide, facilitator, and co-learner, and with other instructors as peers and co-learners. Samantha and Brian possessed strongly integrated values of the students coming first before anything else, as well as learning being more important than grades combined with beliefs that students are too focused on grades, learn better when instruction is facilitated, not disseminated, and that students need to have their desire to learn reawakened through good instruction. These beliefs and values strengthened the kinds of language, actions, and interactions shared by Samantha and Brian above. They preferred the location or place of a small group, face-to-face class best, although an online class was much preferred to a large group lecture hall. Finally, Samantha and Brian used the tools of guided inquiry, collaborative projects, independent study, and online learning environments to enact their identity of a good instructor.

The Discourse of technological change was evident through the language used by the instructors. Language like embracing and accepting were used by Samantha and Brian to enact the identity of an individual that supports technological change. Their actions that supported this language were early adoption of new technologies and an availability to instruct students in how to use virtually any technology. Interactions that influenced this Discourse were the Samantha and Brian's interaction with technological change and their encouragement of others to adopt technological change. Of significant note was that Brian spoke the language of technological change, yet minimized his interaction with it, while Samantha both spoke and interacted fully with technological change. This seems to indicate that Brian provided counter talk to the Discourse, helping to redefine the identity of an adopter of technological change through his reticence to adopt change. Values and beliefs of Samantha as an immediate adopter were that change for the sake of change was virtually always a positive thing, and that

adopting new technological change is also almost always positive. The reticent adopter (Brian) seemed to counter these beliefs with a desire to only adopt technology that would fit his current instructional practices. Tools used by both Samantha and Brian to make this Discourse relevant were the actual technology available, as well as their theoretical orientation and instructional methodologies.

CONCLUSION AND FUTURE DIRECTIONS

As revealed through our use of discourse analysis, the roles of the instructors were transformed from teacher-centered to student-centered, regulated interactor to accidental and regular interactor, and low-initiator to high-initiator. These roles changes are confirmed in the literature discussed above.

There was also an obvious merging or synthesis of the roles of the lecture and lab instructors, particularly in the areas of course administration, subject matter expertise, and face of the course. Relevant Discourses exposed were that of being a good instructor and that of being an adopter of technological change.

There are five lessons that we learn from Samantha and Brian's experiences with teaching a blended course that could be applicable on a wider basis:

1. ***Understand your instructor's perspective*** on what is a good instructor. If the instructors in this study had begun with different theoretical orientations and teaching practices, their roles would most likely have changed in a different manner. If you are seeking to transition a course to a blended approach you must consider what your instructors bring to the table. One instructor may be a gifted lecturer while another may be outstanding at leading and facilitating discussions. Choosing the right person for the right environment in this case may mean giving the online lecturer role to the instructor with the discussion facilitation skills and finding another place for the other person. It will also most likely result in less of a learning curve for the instructor as he or she becomes familiar with the online environment.
2. ***Consider your instructors and students familiarity with technology.*** Not every course is well-suited for an online environment, and one of the factors that contributes to that is the instructor's comfort around technology. Is the instructor fearful of new technologies, or do they embrace it? Are the students familiar with technology, or do they hold a more apprehensive attitude? Addressing these concerns may mean choosing a different instructor, providing more technology training for instructors.
3. ***Get rid of the lecture/lab division.*** The instructors of this course suggested that the lab/lecture division be abolished. In its place will be a course structure that is divided into groups of students. The three current instructors (two lab and one lecture) will each teach three labs and be responsible for the online lecture instruction of the same students. A uniform online curriculum will help control for individual teacher differences and assure high quality content, opportunity for more future research and an opportunity to market the course statewide.
4. ***Train, train, train.*** Instructors also listed the need for teacher training as a high priority for future directions. It was suggested that training in issues related to time, technical aspects, how to teach online, and audience analysis were needed. It was also suggested that new instructors should "shadow" experienced instructors in an apprentice-master arrangement. This methodology would help new instructors to approach teaching equipped with realistic expectations, competent pedagogical and technical skills, and confidence in instruction.
5. ***Go with the flow.*** Moving a large group lecture to an online environment will most likely create potential opportunities to construct a more student-centered instructional environment. Instead of resisting change and trying to keep traditional roles and responsibilities intact, embrace change. Here's a few ways you can do this:
   a. Allow the increased interaction with students to replace more formal information conveyance techniques.
   b. Permit traditional assessments to give way to more authentic, online projects.
   c. Take advantage of the opportunites for collaborative learning that a blended environment affords.
6. ***Time is of the essence.*** Crucial to a shift to a blended approach is the large increase in time commitment for instructors. It is important to be aware of this increase, and to plan accordingly. Plan for more instructors, and increased hours in current instructor's schedules. Meet with your instructors to envision them for this change, and equip them with the planning skills necessary to work together as a team instead of merely as a group of individuals. In our study, the move to an online environment prompted more interaction between instructors, forcing all instructors to be subject matter experts of both spheres of content, spreading responsibilities across all instructors, and creating an instructional team rather than individual instructors. Be sure that your team is ready for this kind of shift as well.

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However, the aforementioned literature is focused on courses that make a complete shift to an online format. Other research looks at blended formats of the same course (partially online and partially face-to-face). A shift to an online environment for teaching and learning can lead to a big change in the roles of instructor.

Finally, the results of the narrative analysis were laid as a tracing upon the discourse analysis results, and conclusions were made regarding the similarities and differences. Both methodologies were used in order to provide methodological triangulation (Mathison, 1988), thus increasing the validity of the study.

And narrative analysis (Labov 1972). Following Labov's (1972) narrative methodology, data analysis consisted of dividing the narrative into clauses that were then cataloged into six components; abstract (summary), orientation (sets the scene), complicating action (central details or problem), event (actual happening), evaluation

(narrator judgments), and coda (conclusion and reflections). This methodology allows the researcher to understand the central themes of the narrative and to become acclimatized with the narrator's perspective and interpretive framework. This analysis was applied to the narrative and journal notes of one of the lab instructors.

EXPLORATION OF THE ATTITUDES OF FRESHMAN FOREIGN LANGUAGE STUDENTS TOWARD USING COMPUTERS AT A TURKISH STATE UNIVERSITY

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ABSTRACT
The present study expands the design of Warschauer (1996) surveying freshman foreign language students at a Turkish university. Motivating aspects of computer assisted instruction in terms of writing and e-mailing are explored through an exploratory factor analysis conducted on the survey developed by Warschauer (1996). Findings suggest that learners have positive attitudes towards CALL because of computers' potential to sustain independence, learning, collaboration, instrumental benefits, empowerment, comfort and communication. Influence of several background variables on attitudes towards CALL is also explored through relevant parametric tests. Analyses revealed that gender and age did not have an effect on attitude scores whereas having a PC at home, PC experience and hours of Internet use were related to attitudes towards CALL. Implications of the present study and suggestions for further research are provided.

Keywords: CALL; Computer Mediated Communication (CMC); Attitudes; Computer assisted writing.

INTRODUCTION

Learning a second language is a process, which requires time, effort and patience. The learner needs to be actively involved in this process. Such active involvement depends largely on learners' attitudes, particularly on motivation. In recent years, there has been multifarious studies re-examining the relationship of second language learning (henceforth, SLA) and motivation, and criticisms and elaboration of the pioneering studies are suggested.

Gardner & Lambert (1972) reported the ways they established scientific research procedures in terms of SLA research, and brought second language (L2) motivation research to maturity to some extent. However, their model which also differentiated between integrative and instrumental motivation has been criticized a lot since it is on general motivational components in social psychological theory rather than educational theory. More specifically, even though it does include an educational dimension allowing learners to evaluate learning situations, its emphasis is more on basic motivational aspects in social settings rather than in SLA settings (Crookes & Schmidt, 1991).

Dörnyei (1994) claims that L2 motivation is an eclectic and multifaceted construct which necessitates introduction of different levels of motivation, namely 'language level' that coincides with the social dimension, 'learner level' that coincides with the personal dimension and 'situation level' that is in line with the subject-matter dimension. Moreover, he considers the literature on motivation to be far from being pragmatic. Therefore, in order to provide educators with a more precise guide to make teaching more motivating, practical motivational strategies should be listed (Dörnyei, 1994).

Motivation has been generally examined under the headlines of being either intrinsic or extrinsic 'depending on whether the stimulus for the behavior originated outside or inside the individual' (Van Lier, 1996: 101). The basic motive behind this differentiation is that some aspects of the motivation are related with past and future sources of internal urge (i.e. extrinsic) and some others are related with present sources of the very same urge (i.e. intrinsic). Language and language learning are complex issues; therefore, it is not easy to claim that language learning should be considered under the basic headline of intrinsic motives. It of course has intrinsic aspects, because when language skills and challenges are balanced, the learner experiences a stage of equilibrium and finds pleasure in doing the activity at that moment. It should not be considered just under the headline of extrinsic motives, either. It has extrinsic aspects, that is, goals in directing action might be comprised of instrumental drives, needs and other responses.

Oxford & Shearin (1994) claim that the traditional model that differentiates between intrinsic and extrinsic motives is too general or ill-defined. They maintain that in order to determine the source of the real motives, goal-setting can have exceptional importance in stimulating L2 learning motivation; therefore, more time and energy should be spend in the L2 classroom on goal setting. They suggest that goals, expectancies and self-efficacy affect performance because they promote persistence and increased effort especially on tasks with time limits. Individual goals direct attention toward goal-relevant action, stimulate individuals to develop meta-cognitive plans and enhance the quality of analytic strategies used. Beside goal setting theories, expectancy

theories also play an important role in determining the features of motivation since organisms anticipate events, and their behaviors are sometimes guided by those anticipatory states. Therefore, the higher the expectancy for a behavior to produce a specific outcome, the greater tends to be the motivation.

According to Van Lier (1996), motivation might have three different sources. It may stem from the past experiences which might be drives, needs, learning or other responses programmed throughout time in the learner. It might be in the present that is the enjoyment of the performance in present, which generally coincides with intrinsic motivation. It might also be in future such as the goals directing learners to act. Future goals might be either intrinsic or extrinsic. In language teaching, it is not easy to find clear-cut distinctions between those three aspects. Individual variables such as learner orientation and need achievement, situational variables such as the nature of the learning materials, teaching techniques and teacher attitudes might all affect the way motivation finds itself (Gardner & Tremblay, 1994). Therefore, in computer assisted language learning settings (henceforth, CALL), it is important to find out about the motivating aspects and positive attitudes towards computers, since these aspects of CALL constitute a fertile field that needs further scrutiny.

CALL and motivation

Computers have been used for language teaching since 1960s. This period is divided into three periods by Warschauer & Healey (1998). The first one is Behaviorist CALL featuring repetitive drills which is also named drill and practice method. The second one is Communicative CALL, which is the correspondence of cognitive theories that recognized learning as a creative process, and rejected Behaviorist CALL. This period focused more on using forms rather than the forms themselves. The third one is Integrative CALL, which moved the theory from a cognitive view to a socio-cognitive view, and gave importance to authentic use of language in meaningful contexts. It also emphasized the integration of each skill via multimedia networked computers providing foreign language learners with opportunities to use information, communication and publication tools.

Lee (2000) identifies eight categories to which net-work-based technology may contribute, namely experiential learning, motivation, amelioration of student achievement, supply of authentic materials for study, greater opportunities for interaction, support for individualized learning, independence from a single source of information and global understanding. Chapelle and Jamieson (2002) provide a more precise outline of the contributions of computer-assisted instruction under three basic themes that are elaborated further, namely offering elaborated and rich input, providing negative feedback and promoting collaborative learning. Interestingly, Chapelle and Jamieson (1991), reviewing results of research into the effectiveness of CALL, had said that they had not found superiority of CALL over classroom instruction.

Several sets of conditions that should be created for successful language learning with regard to computer applications are clearly identified in Chapelle (2001). One of these issues is examined under the title of affective aspects of learning on which there is a vast literature. The view Lee (2000) elaborates on about motivation is unfortunately intuitive, that is, he claims that computers are popular among students just because of their being fashionable or their being associated with fun or games. However, the prelude of communication via computers is believed to enhance students' motivation level by providing a less threatening means to learn with, providing stimulating contact, and facilitating work on meaningful activities, since computer assisted communication changed the routine from student-machine interaction to student-student interaction (Warschauer, 1996).

In this respect, it is relevant to take Warschauer's (1996) criticisms into account. He claims that much of the research is devoted to computer-assisted instruction in general. However, foreign language instruction is a complex issue which should be scrutinized more. Secondly, he claims that research regarding motivational aspects of computer-assisted instruction is outdated. He is right to the extent that in recent years there have been great developments in technology. Multimedia-tools, network applications and World Wide Web have become more popular generating new dimensions that could be motivating. For instance, with the rise of e-mailing and World Wide Web, beside the novelty of the material and learner control as motivational aspects (Kinzie, Sullivan & Berdel, 1988), the construct of 'willingness to communicate (WTC)' appears on stage. MacIntyre, Clement, Dörnyei and Noels (1998) define this issue as a 'situation-based variable representing an intention to communicate at a specific time to a specific person' (p. 559). What Van Lier (1996) meant when he introduced authentic engagement in an activity was probably one of the antecedents of WTC. Moreover, if WTC is conceptualized as something 'situation-based', this brings the idea that classroom learning activities and classroom applications of computers interact with and influence the development of the desire to communicate. The notion of the desire to communicate also suggests that WTC is individual-based as well.

The current study basically deals with attitudes towards using computers and network applications in communication and in writing. Pennington (1996) reviews a substantial number of previous studies on first

language (L1) and foreign language (L2) computer writing and concludes that computers are beneficial in writing processes, revision behavior, affective/social outcomes, quality of the written work and quantity of writing. Warschauer (1996) surveyed learners' feelings and attitudes toward computer writing and e-mail communication. Results indicated that students had positive attitudes toward computer writing and computer mediated communication. They could write better, be more creative and save time using word processing compared to writing by hand. Chikamatsu (2003) examines the effects of computers on writing efficiency and quality among intermediate learners of Japanese and concludes that writing is a process which requires multiple planning, developing and revising phases that are accomplished in a joyful and effective way via computers even with a logographic language (i.e. Japanese).

Our second concern is the motivational aspects of using computers in communication. This concern stems from the WTC construct, which is generated from Vygotsky's (1978) ideas of learning from a social dialogue. Computer mediated communication (henceforth, CMC) is also considered to be a tool just like a word processing program to realize communicative purposes rather than an omnipotent instructional source. It involves direct human-to-human interaction rather than human-to-machine interaction which is considered to be one of revolutionary developments in computer-based fields (Warschauer, 1996).

Sullivan (1993) claims that computer-mediated language classrooms encourage collaborative learning, social interaction, and invention that will eventually result in increased self-esteem. According to Sayers (1993), through sharing culture packages and collaborative projects between different classes via CMC tools, students are provided with opportunities to display and share their linguistic competencies and varied cultural experiences which foster genuine language learning and authentic knowledge. After collecting data via a longitudinal study of first-year German students, Chun (1993) concludes that CMC allows students to play a greater role in managing the discourse. They feel freer to suggest a new topic, follow-up their friends' ideas and request more information. The important point here is that they are more motivated to take the initiative than they are in the normal classroom since the instructor's role in CMC setting is decentralized. Warschauer (1996) identifies four basic motivating aspects in computer assisted language instruction namely, the novelty of working with a new medium, individualized nature of computer-assisted instruction, opportunities for learner control and opportunities for non-judgmental and rapid feedback.

CMC offers the promise of increased interaction not only locally but also globally using the resources such as World Wide Web in addition to providing learners with opportunities to negotiate outside the classroom (Kern, 1996). Kern (1996) further claims that learners shift from a consultative mode to a real communicative mode through CMC. Consultative mode involves using a finite and authoritative informational base in order to realize language related tasks. In contrast, communicative mode involves learners in interaction, asking questions, providing explanations, comparing interpretations and working collaboratively with both their teachers and peers. This sustains control over learning in which learners can achieve greater learning in the same amount of time than can student not given such a control (Kinzie et al. 1988).

It is relevant here to state Sullivan's (1993) ideas both in terms of computer writing and CMC. She identifies five ideal characteristics that could be realized better in a computer-assisted language classroom. First of all, meaningful interaction allowing individual accountability is realized better in a computer writing classroom via support of PC networks. This is mostly because a network environment is freer of risk than any traditional teacher-centered classroom. Secondly, positive interdependence is realized via networks in which students are free and encouraged to collaborate in generating discussion groups, which also allows them to critique each other's papers. Thirdly, dissention is encouraged in CMC environments, that is, students feel free and confident to voice opposing viewpoints at the computer since computers are 'nonconfrontational'. Fourthly, students have opportunities to negotiate meaning and improve their problem-solving skills. Finally, what is created in CMC settings could be better stored which allows reviewing and elaborating on ideas for further activities.

Warschauer (1996), integrating the issue of computer writing and CMC, and surveying 167 university students in different ESL and EFL academic writing settings, concludes that language students have positive attitudes toward using computers for writing and communication in language classrooms. Factors influencing students' attitudes toward computers are considered to be instrumental benefits of computer-mediated communication, the feeling of personal empowerment and a sense of achievement.

The present study adapts the survey of Warschauer (1996) for our unique context, freshman foreign language students. The motivating aspects of using computers for these students in terms of computer writing tasks and computer assisted communication are explored. The study specifically focuses on the following research questions:

1. What aspects of using a PC for writing and communication create positive attitudes in freshman foreign language students?
2. Do attitudes towards CALL vary when different backgrounds are taken into consideration?

METHODS AND PROCEDURES

Participants

A hundred and fifty five freshman students at a Turkish state university in Eskisehir, Turkey participated in the study. All of them are native speakers of Turkish and speak English at an advanced level. Profile of the participants is provided in Table 1:

Table 1. Profile of the participants

		Frequency	Percent (%)
Gender	Male	41	26,5
	Female	114	73,5
PC at home	Yes	75	48,4
	No	80	51,6
Age	17-19	106	68,4
	20-22	42	27,1
	23 and over	7	4,5
	Total	**155**	**100**

Data Collection

Students were administered an anonymous survey in English. The survey used by Warschauer (1996) was taken as the core of our survey; however, some items were revised in accordance with the study context after it was administered to five students to find out about the ambiguous items. The first part of the survey included a personal information form which was used to collect the independent variables of the study, namely, gender, age, family income, and number of years' experience with a PC. Students were also asked to specify whether they had a computer at home / dormitory or not. They were asked to rate the frequency of using PCs for several purposes through a Likert-type questionnaire. The format of this part created a high internal reliability for the sample group (α=.835). Finally, students were asked to state the hours of using Internet per week.

In the second part of questionnaire, 30 five-point Likert Scale questions (5 being the highest score) were asked that were related to students' feelings about using computers. Eight of the questions were reverse-coded in order to increase the reliability of the instrument. Throughout the paper, the reversed version of the sentences will be used so that a consistency could be built for readers. The first five questions primarily focused on using computers for word processing. The next 11 questions focused on using computers for interpersonal communication and e-mailing. Final 14 questions elaborated on students' general feelings about using computers in their composition classroom.

The students were administered the survey during their normal class period at the 10th week of the 2006 fall semester. They were given clear instructions about the questions and the scales.

Data Analysis

First, constructs underlying the questionnaire of Warschauer (1996) in the Turkish context have been examined through factor analysis. Factor analysis is used to summarize the questions within plausible components. The analysis is used as a data reduction technique, which takes a large set of variables and looks for a way to reduce or summarizes the data using a smaller set of components (Pallant, 2001). As the factor analysis, Maximum Likelihood was applied as the extraction method. In the current data, it was possible to apply principal component analysis as well, which is more popular (Pallant, 2001). The principal component analysis could explain 64 % of the variance which was great based on the suggestions of Dunteman (1989). Nevertheless, a conservative path was followed which led to more robust results. The assumption of multivariate normal distribution was given utmost importance which is controlled by the Maximum Likelihood estimation. This estimation was also considered more robust to the effect of small sample sizes (Tanaka, 1987). Moreover, it was shown that ML estimates are least affected in comparison to alternative methods used for non-normal samples (Tanaka, 1984). Finally, ML tends to provide a strong and more appropriate test to determine how many factors underlie the data (Kroonenberg & Lewis, 1982). Thus, items of the scale were examined through the ML extraction method.

After the factors were determined, each factor was investigated through further parametric tests to see the influence of each predictor variable on total scores in the questionnaire. T-tests were used to compare students in terms of having a PC at home, and in terms of gender; one-way ANOVAs were used to compare age groups; and Pearson Product Moment correlation coefficient was used in order to find out the relationship between factor scores and the predictor variables. Significant correlation coefficients were determined according to statistical tables of Fisher (1963). For all analyses, the data were checked in accordance with the normality and equal variances assumptions. For normality, skewness and kurtosis coefficients were checked as suggested by Huck (2000). For the equal variances assumption, Levene's Test value was examined.

RESULTS

Before conducting the factor analysis and examining students' CALL attitude scores, participants' PC use habits were reported first. This might provide readers with a clearer idea about the background of the sample participated in the current study. In order to determine which features of PCs were used most by the sample, 14 one-sample t-tests were conducted for 14 features with a Bonferroni Adjustment which reduced the critical alpha from .05 to .0036. More specifically, the frequency of use for each PC use habit was compared to the neutral value of 3. Analyses revealed that students often used PCs for e-mailing (χ=4.44; t=18.07; p<.001), researching via the web (χ=4.72; t=26.310; p<.001), chatting (χ=3.72; t=6.666; p<.001), watching movies (χ=3.59; t=5.560; p<.001), and online registration (χ=3.37; t=3.217; p<.001). They rarely used PCs for database (χ=2.18; t=-7.516; p<.001), excel (χ=2.31; t=-7.342; p<.001), graphics design (χ=2.40; t=-5.835; p<.001) and games (χ=2.55; t=-3.727; p<.001). Below, research questions are addressed in line with corresponding parametric tests.

a. What aspects of using a PC for writing and communication create positive attitudes in freshman foreign language students?

The mean score for all students were 3.53 which were greater than the neutral mean at a statistically significant level (T_{153}=13.687, p< .001). The question that generated the highest positive response was the 24th question, "learning how to use computers is important for my career" (χ=4.45, T_{153}=4.065, p<.001). Each question's mean and standard deviation will be reported after the inappropriate scale items have been eliminated through the factor analysis.

Items of the scale were examined through maximum likelihood analysis using SPSS 15.0 for windows. First of all, the suitability of data for factor analysis was assessed. The first concern was the sample size. Kass and Tinsley (1979) suggest having between 5 and 10 subjects per items of the scale up to a total of 300. If the number reaches up to 300, test parameters tend to be stable regardless of the subject to variable ratio. Field (2000) and Tabachnick and Fidell (1966) agree that it is plausible to have at least 300 cases for factor analysis. Finally, Comrey and Lee (1992) believe that 100 is poor sample size, 300 can be considered as good, and 1000 and more is excellent. Based on this information, it can be said that the current data is slightly above the suggested limits in terms of sample size. The current sample (N=155) included five times more participants than the number of items as suggested by Kass and Tinsley (1979). However, further inspections were conducted as suggested by Pallant (2001). Thus, the next step was to check the Kaiser-Meyer-Oklin Measure of Sampling Adequacy.

Kaiser-Meyer-Oklin Measure of Sampling Adequacy is calculated for individual and multiple variables and represents the ratio of the squared correlation between variables to the squared partial correlation between variables (Field, 2000). The KMO value varies between 0 and 1. A value of 0 indicates that the sum of partial correlations is large relative to the sum of correlations, whilst a value close to 1 indicates that patterns of correlations are compact, and so factor analysis will yield reliable factors. Kaiser (1974) suggests that values greater than 0.5 should be accepted. Pallant (2001) claims that the KMO statistic should be larger than 0.6. Hutcheson and Sofroniou (1999) suggest that values between 0.5 and 0.7 are normal, values between 0.7 and 0.8 are good, values between 0.8 and 0.9 are great, and values above 0.9 are superb. The initial solution of our factor analysis revealed a KMO value of 0.766, which is far better than the acceptable value.

Next concern is that Bartlett's Test of Sphericity should reach a significance value to support the factorability of the correlation matrix obtained from the items (Pallant, 2001). Bartlett's Test of Sphericity revealed an ideal Approx. Chi-Square value (χ^2=1432.732) with a significance value of .0005, which meant that the factorability of our correlation matrix was proper. The maximum likelihood analysis revealed the presence of 8 components with eigenvalues exceeding 1, which explained 46.429 % of the total variance. Field (2000) suggests that loadings less than 0.4 be suppressed in the output. Besides, Pallant (2001) claims that if items load above 0.3, this is a strong loading which should not be deleted. Most items had loadings above 0.3, and variables with lesser values were deleted from the analysis. Next, items with very close loadings (i.e. less than .01) under different

components were suppressed from the analysis to prevent multicollinearity. Only two items (i.e. question 5 and 10) had small corrected item-total correlation values (i.e. .218 and .216, respectively) which were also suppressed as suggested by Pallant (2001). The factor analysis was repeated revealing 7 factors with eigenvalues exceeding 1.0. The total number of questions was determined as 23 which meant that seven questions were eliminated from the scale. The analysis with the new set of items revealed a better KMO value along with an ideal Bartlett value again as can be seen in Table 2:

Table 2. KMO and Bartlett's Test

Kaiser-Meyer-Oklin measure of sampling adequacy	,786
Bartlett's Test of Sphericity	
Approximate χ^2	1360,301
Df	378
Sig.	,001

The Cronbach's Alpha was .867 after the problematic items were suppressed. The analysis explained 45.731 % of the total variance. It is claimed that the higher the variability explained by the factor analysis, the stronger the factor structure of the scale is. However, values ranging from 40 % to 60 % are considered acceptable for social studies (Dunteman, 1989). Thus, the variance explained is considered appropriate for the current study. Variance explained by each component is illustrated in Table 3:

Table 3. Total variance explained

Component	Initial Eigenvalues			Sums of Squared Loadings after Extraction and Rotation		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1,000	7,085	25,303	25,303	2,733	9,760	9,760
2,000	2,104	7,514	32,818	2,383	8,512	18,272
3,000	1,853	6,618	39,436	2,097	7,490	25,763
4,000	1,619	5,783	45,219	1,747	6,240	32,002
5,000	1,438	5,134	50,353	1,409	5,034	37,036
6,000	1,257	4,490	54,842	1,400	5,001	42,036
7,000	1,168	4,173	59,015	1,035	3,695	45,731
8,000	1,003	3,583	62,598			
9,000	0,969	3,460	66,058			
10,000	0,916	3,273	69,331			
11,000	0,824	2,944	72,275			
12,000	0,815	2,909	75,184			
13,000	0,724	2,584	77,768			
14,000	0,706	2,521	80,288			
15,000	0,655	2,339	82,627			
Subsequent rows are omitted to save space.						

As mentioned above, the number of factors was determined as seven. To interpret factors, they are rotated through Varimax Rotation. It is an orthogonal approach which assumes that the factors are not related. Moreover, Varimax Rotation tends to be easier and clearer to interpret (Pallant, 2001). Seven factors after rotation showed a slightly different pattern from that of Warschauer (1996). Factors included in each label, item means and standard deviations, and Varimax rotation loadings are provided in Table 4:

Table 4. Means, standard deviations, and Varimax rotation loadings:

Items and Factors		Mean	SD	Varimax factor load
Factor 1:Independence (α=,805)				
27	I can learn English faster when I use a computer.	3,191	0,995	,717
25	I can learn English more independently when I use a computer.	3,658	1,041	,648
28	Using a computer gives me more chances to practice English.	3,771	0,914	,624
22	Using a computer gives me more control over my learning.	3,392	0,890	,500
19	Using a computer gives me more chances to read and use authentic English.	3,561	0,968	,477
20	I want to continue using a computer in my other classes.	3,871	0,978	,429
Factor II: Learning (α=,69)				
15	Using e-mail and the Internet is a good way to learn more about different people and cultures.	4,221	0,850	,622
17	Learning to use a computer gives me a feeling of accomplishment.	3,845	0,846	,489
16	Communicating by e-mail is a good way to improve my English.	3,812	0,975	,462
9	I enjoy using the computer to communicate with my teachers.	3,314	1,079	,447
4	I enjoy seeing the things I write printed out.	3,877	0,893	,418
Factor III: Collaboration (α=,728)				
13	Writing to other by e-mail helps me develop my thoughts and ideas.	3,316	1,051	,798
14	Using e-mail and the Internet makes me feel part of a community.	3,455	1,132	,625
11	E-mail helps people learn from each other.	3,753	1,044	,605
Factor IV: Instrumental benefits(α=,701)				
1	I can write better essays when I do them on computer.	2,682	1,113	,717
3	I enjoy writing my papers by computer than by hand.	2,757	1,297	,661
2	Revising my papers is a lot easier when I write them on computer.	3,253	1,169	,536
Factor V: Empowerment (α=,704)				
26	Computers keep people close to each other.	2,701	1,264	,757
30	Computers make people strong and powerful.	3,471	1,229	,655
Factor VI: Comfort (α=,703)				
8	I am more afraid to contact people in person than by e-mail.	3,808	1,011	,532
21	Using a computer is worth the time and effort.	3,844	1,073	,426
Factor VII: Communication (α=,772)				
6	I enjoy using the computer to communicate with people around the world.	4,301	0,932	,535
7	I enjoy using the computer to communicate with my classmates.	3,922	1,169	,697

The author suggests that the total score be used as the attitude score towards computer assisted writing. The maximum possible score from the current 23-item scale is 115 while the minimum score is 23. The maximum score of the current sample was 104 while the minimum score was 44. The total score calculated for the current sample revealed a normal distribution with ideal skewness and kurtosis values as suggested by Huck (2000). The current sample's descriptive statistics are provided in Table 5.

Table 5. Descriptive statistics of the total scores

		Statistic	Std. Error
Mean		81,993	0,926
95% Confidence Interval for Mean	Lower Bound	80,164	
	Upper Bound	83,822	
5% Trimmed Mean		82,621	
Median		82,000	
Variance		132,864	
Std. Deviation		11,527	
Minimum		44,000	
Maximum		104,000	
Range		60,000	
Interquartile Range		15,000	
Skewness		-0,880	0,195
Kurtosis		1,229	0,387

b. Do attitudes towards CALL vary when different backgrounds are taken into consideration?

Overall scores of the students were examined with regard to several independent / predictor variables. Two independent-samples t-tests were conducted for the influence of gender and for that of having a PC at home. Then a one-way ANOVA was conducted to see the influence of age. Since three parametric tests were conducted, Bonferroni Adjustment was applied to reduce the likelihood of committing a Type I error as suggested by Huck (2000). Thus, the alpha was determined as .016 for the parametric tests.

Gender

In order to determine whether attitude scores differed between male and female students, an independent-samples t-test was conducted. The independent-samples T-test is provided in Table 6:

Table 6. Independent samples t-test comparing males and females in terms of total scores

	N	Mean	SD	T	df	Sig.
Male	41	82,634	13,252	,414	153	,679
Female	114	81,762	10,895			

The independent-samples t-test comparing scores of male and female students showed that males and females did not differ from each other in terms of attitudes toward computer assisted writing and communication.

Having a PC at Home

In order to see whether total scores differed between students who had a PC at home from those who did not, another independent-samples t-test was conducted. After the normal distribution and equal variances assumptions were checked, the independent-samples t-test was conducted. The summary table is provided below:

Table 7. Independent samples t-test comparing total scores of students who have a PC at home and those who do not

	N	Mean	SD	T	df	Sig.
Yes	75	84,359	11,657	2,518	153	,013
No	80	79,774	11,019			

As the table suggests, the test revealed that students who had a PC at home had significantly more positive attitudes towards computers than students who did not have a PC at home.

Age:

In order to see whether the students' attitudes towards CALL varied in accordance with age, a one-way between-groups ANOVA was conducted. Table 8 provides the descriptive statistics regarding age groups:

Table 8. Desciptive statistics regarding age

	N	Mean	Std. Deviation
17-19	106	82,509	11,627
20-22	42	80,523	11,562
23 and over	7	82,999	10,488

As the table suggests, the means did not seem to differ a lot from each other. The summary of the one-way ANOVA is given in Table 9:

Table 9. Summary of one-way ANOVA on age groups

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	125,987	2,000	62,993	0,471	0,625
Within Groups	20335,006	152,000	133,783		
Total	20460,993	154,000			

As the result of the ANOVA revealed, the groups did not differ on their attitudes towards CALL in terms of age.

Other Predictors of Total Scores

Other variables addressed in the questionnaire had a continuous nature which required calculating correlation coefficients between those variables and the total scores in the questionnaire. In this section, four variables were checked and interpreted to examine whether they had a predicting role in overall scores. Thus, a Bonferroni Adjustment procedure was applied and the significant p-value was determined as .0125 in the following table:

Table 10. Pearson correlation coefficients among potential predictor variables

Correlations	Total scores on the questionnaire	Experience	Monthly Income	Internet use (Hour / week)
Total scores on the questionnaire	-	0,177*	0,083	0,408**
Experience with a PC		-	0,289**	0,140
Monthly income			-	0,137
* Correlation is significant at the 0.05 level (2-tailed).				
** Correlation is significant at the 0.01 level (2-tailed).				

As the table suggests attitude scores of the sample were positively related with experience with a PC and hours of Internet use per week. Moreover, a relationship between the experience with a PC and monthly income was found which was expected.

DISCUSSION

The current study tried to adapt the questionnaire developed by Warschauer (1996). The questionnaire tries to address different levels of motivation including the language level, learner level and the situation level as suggested by Dörnyei (1994). In order to identify practical motivational strategies as suggested by Dörnyei (1994), motivational aspects regarding language learners were investigated first, which could be a contribution attributed to the present study. Besides, the questionnaire involves both extrinsic and intrinsic characteristics of motivation. However, more comprehensive works focusing on student characteristics in terms of goal setting and expectancy theories are needed to nourish the theoretical framework in line with the suggestions of Oxford and Shearin (1994).

Exploratory factor analysis revealed seven factors with high internal reliability coefficients and eigenvalues which were named as independence, learning, collaboration, instrumental benefits, empowerment, comfort and communication. Factors were somewhat similar to those of Warschauer (1996) with slight changes and additions within and among factors. Warschauer (1996) had named his factors as independence and creativity, communication, learning, achievement, and instrumental benefits of writing. The differences between two exploratory factor analyses suggested that the factor structure of a reliable and valid CALL attitude scale could vary according to the language context. However, in order to create robust theories in terms of the difference of factors among contexts, structural equation modeling analyses are needed where students from several contexts

are administered the same questionnaire, and confirmatory factor analyses are conducted followed by model fit controls assuming equal factor structure among different contexts.

Factor structure of the current scale supported the hypotheses of Lee (2000) and Chapelle and Jamieson (2002), that is, CALL involved an atmosphere promoting communication and collaborative learning. The notion of *willingness to communicate* was on stage as suggested in previous studies (Kern, 1996; Kinzie et al., 1988; MacIntyre et al., 1998; Warschauer, 1996). Affective social outcomes and enriched quality of the written work were addressed in the factor structure which supported the hypotheses of Pennington (1996). Students had increased self-esteem since they did not have to face their addressees in person, which was previously suggested by Chun (1993) and Sullivan (1993). Finally, factors and means scores on relevant items implied that students were more creative, wrote better essays, and saved time using computers in comparison to writing by hand (Warschauer, 1996).

As suggested by Van Lier (1996), one of the sources of motivation is past experiences. The current study revealed that past PC experiences have a predictive value on total attitude scores. Enjoyment of the performance generally coincided with intrinsic motivation (Van Lier, 1996), which was emphasized through the scale developed in the current study. However, future aims should be scrutinized with more comprehensive works. For example, the item with the highest mean was the 24th question "Learning how to use computers is important for my career", which addressed future goals; however, the item was eliminated through the exploratory factor analysis. Better items addressing goals and expectancies might be developed to create instruments which can elaborate on past experiences, present enjoyment and future expectancies simultaneously. Moreover, variables addressing learning materials, teaching techniques and teacher attitudes might be added to research designs to scrutinize situational variables better, which might retain the hypotheses of Gardner and Tremblay (1994) on the effects of situational variables on motivation.

Approximately 83 % of the items in the current scale generated positive responses toward using computers in instruction. One could claim that questions constantly generating higher scores than the neutral level should be considered with caution for respondents might have answered all questions with the same pattern. However, students' responses stayed consistent even with the reverse coded items. Moreover, even though Type I error risk was strictly decreased, there were still many items generating significantly positive responses. The results support the assumptions of Lee (2000), that is, computer assisted language instruction might lead to more positive attitudes.

Having a PC at home seemed to have an effect on positive attitudes towards CALL. Warschauer (1996) did not find an influence of the ease of access which was refuted in the current work. However, this result should be examined with caution. Buying a PC can be caused by high positive attitudes towards computers rather than vice versa. Qualitative in depth analyses should be conducted to understand whether students had bought their PCs because they had positive attitudes, or whether they had positive attitudes because they had a PC at home. Finally, gender was not an effective factor on attitudes towards CALL which supported the findings of Warschauer (1996).

Foreign language teachers may enhance students' positive attitudes and motivation by helping them get more knowledge and necessary skills about using computers. As Warschauer (1996) points out, giving students more opportunity to use CMC tools and integrating computer activities into EFL settings can help teachers enhance students' motivation. Allowing students to participate more in efficient negotiation of meaning with anyone they want, on any subject matter they wonder and at any time they wish to participate is a motto, which cannot always be realized in even communicative classrooms. Therefore, computer mediated settings might have the potential to sustain those features and create an ideal atmosphere in language classrooms relatively easily. In this respect, it is crucial for teachers to get theoretical and methodological knowledge and experience on CMC tools in order to help students have more opportunities to communicate via computers and be more motivated toward language learning.

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STUDENT SURVEY
PART I

Dear Friend,

With innovations regarding information and communication technologies, it is timely to review students' attitudes towards various aspects of computer assisted learning. The following two-part survey has been designed to diagnose your overall attitudes regarding language learning activities through computers rather than for the purposes of personal evaluation. There is therefore no need to identify yourself by name, and your anonymity in responding to these questions will be safeguarded. We shall be most grateful for time and care you give to answering all of these questions, which will enable us to accurately evaluate the results. Thank you for assisting us in this research study.

Yavuz Akbulut

yavuzakbulut@anadolu.edu.tr

Sex: □ Male □ Female

Year of Birth: 19 _ _

No. of years' experience with a computer

□ 2 years or less □ 3-4 years □ 5-6 years □ 7-8 years □ 9-10 years □ more than 11 years

Family's monthly income

□ 0-570 TL □ 571-1210 TL □ 1211-1854 TL □ 1855-2500 TL □ 2500 TL or more

Do you have a personal computer of your own at home / dormitory?

□ Yes □ No

How many hours per week do you use Internet?

□ Less than 2 hours □ 3 - 4 hours □ 5 - 6 hours □ 7 - 8 hours □ 9 - 10 hours □ More than 11 hours

What do you use your PC for and how often? (Please mark as many options as appropriate)

	Always	**Sometimes**	**Neutral**	**Rarely**	**Never**
Word processing	□	□	□	□	□
Database (ASP, PhP)	□	□	□	□	□
Spreadsheet (Excel)	□	□	□	□	□
Designing Graphics / Animations	□	□	□	□	□
Presentation (PowerPoint)	□	□	□	□	□
E-mail	□	□	□	□	□
Web videoconferencing	□	□	□	□	□
Web telephony / audio conferencing	□	□	□	□	□
Researching via the web (Google, etc.)	□	□	□	□	□
Online registration / student affairs	□	□	□	□	□
Designing web-based learning material	□	□	□	□	□
Internet chat	□	□	□	□	□
Games	□	□	□	□	□
Watching VCDs, DVDs	□	□	□	□	□

PART II

(Items which have been deleted from Warschauer's (1996) scale after the factor analysis are given in bold)

For each of the remaining statements, please choose the best one that describes you

1= Strongly disagree 2= Disagree 3= Neutral 4= Agree 5= Strongly Agree

	Statement	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
1	I can write better essays when I do them on computer. (χ=2.68; t_{153}=-3.549; p<.001)	( )	( )	( )	( )	( )
2	Revising my papers is a lot easier when I write them on computer. (χ=3.25; t_{153}=2.688; p=.008)	( )	( )	( )	( )	( )
3	(reverse coded) I enjoy writing my papers by hand more than by computer. (χ=2.76; t_{151}=-2.314; p=.022)	( )	( )	( )	( )	( )
4	I enjoy seeing the things I write printed out. (χ=3.88; t_{154}=12.239; p<.001)	( )	( )	( )	( )	( )
5	**(reverse coded) Writing papers by hand saves time compared to by computer. (χ=3.06; t_{152}=.567; p=.572)**	( )	( )	( )	( )	( )
6	I enjoy using the computer to communicate with people around the world. (χ=4.30; t_{152}=17.253; p<.001)	( )	( )	( )	( )	( )
7	I enjoy using the computer to communicate with my classmates. (χ=3.92; t_{153}=9.789; p<.001)	( )	( )	( )	( )	( )
8	(reverse coded) I am more afraid to contact people by e-mail than in person. (χ=3.81; t_{150}=9.817; p<.001)	( )	( )	( )	( )	( )
9	I enjoy using the computer to communicate with my teachers. (χ=3.31; t_{152}=3.597; p<.001)	( )	( )	( )	( )	( )
10	**(reverse coded) If I have a question or comment, I would rather contact my teacher in person than by e-mail. (χ=2.37; t_{152}=-7.137; p<.001)**	( )	( )	( )	( )	( )
11	E-mail helps people learn from each other. (χ=3.75; t_{153}=8.957; p<.001)	( )	( )	( )	( )	( )
12	**An advantage of e-mail is you can contact people any time you want. (χ=4.10; t_{153}=14.687; p<.001)**	( )	( )	( )	( )	( )
13	Writing to other by e-mail helps me develop my thoughts and ideas. (χ=3.32; t_{151}=3.704; p<.001)	( )	( )	( )	( )	( )
14	Using e-mail and the Internet makes me feel part of a community. (χ=3.46; t_{153}=4.981; p<.001)	( )	( )	( )	( )	( )
15	Using e-mail and the Internet is a good way to learn more about different people and cultures. (χ=4.22; t_{153}=17.827; p<.001)	( )	( )	( )	( )	( )
16	Communicating by e-mail is a good way to improve my English. (χ=3.81; t_{153}=10.328; p<.001)	( )	( )	( )	( )	( )
17	Learning to use a computer gives me a feeling of accomplishment. (χ=3.85; t_{154}=12.434; p<.001)	( )	( )	( )	( )	( )
18	**Writing by computer makes me more creative. (χ=3.28; t_{154}=3.221; p=.001)**	( )	( )	( )	( )	( )
19	Using a computer gives me more chances to read and use authentic English. (χ=3.56; t_{154}=7.222; p<.001)	( )	( )	( )	( )	( )
20	I want to continue using a computer in my other classes. (χ=3.87; t_{154}=11.083; p<.001)					
21	(reverse coded) Using a computer is not worth the time and effort. (χ=3.84; t_{153}=9.760; p<.001)	( )	( )	( )	( )	( )
22	Using a computer gives me more control over my learning. (χ=3.39; t_{152}=5.449; p<.001)	( )	( )	( )	( )	( )
23	**I enjoy the challenge of using computers. (χ=3.53; t_{150}=6.563; p<.001)**	( )	( )	( )	( )	( )

24	**Learning how to use computers is important for my career. (χ=4.46; t_{153}=21.874; p<.001)**	( )	( )	( )	( )	( )
25	I can learn English more independently when I use a computer. (χ=3.66; t_{154}=7.870; p<.001)	( )	( )	( )	( )	( )
26	(reverse coded) Computers keep people 'isolated from each other. (χ=2.70; t_{153}=-2.934; p=.004)	( )	( )	( )	( )	( )
27	I can learn English faster when I use a computer. (χ=3.19; t_{151}=2.364; p=.019)	( )	( )	( )	( )	( )
28	Using a computer gives me more chances to practice English. (χ=3.77; t_{152}=10.437; p<.001)	( )	( )	( )	( )	( )
29	**(reverse coded) Computers are usually very frustrating to work with. (χ=3.35; t_{153}=4.500; p<.001)**	( )	( )	( )	( )	( )
30	(reverse coded) Computers make people weak and powerless. (χ=3.47; t_{154}=4.771; p<.001)	( )	( )	( )	( )	( )

ICT USAGE IN HIGHER EDUCATION: A CASE STUDY ON PRESERVICE TEACHERS AND INSTRUCTORS

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ABSTRACT
This study explored the level of usage of preservice teachers' and instructors' utilization of information and communication technologies (ICT). Thus, the main purpose of this study was to examine factors that contribute to preservice teachers' utilization of technology and suggest recommendations regarding to the effective utilization of technology. This case study used data from a school of education in a private university. Results of this study indicated that teacher education programs fail to provide appropriate instructional technologies and computer facilities for both in and out of class activities. Furthermore, three factors that appear to have a significant influence on the effective use of technology were found to be: (1) the quantity and quality of the lessons addressing technology in the curriculum, (2) incompetent teachers/lack of in-service training, and (3) insufficient technological infrastructure.
Keywords: ICT use, teacher education, technology integration

INTRODUCTION

The rapid developments in technology have made tremendous changes in the way we live, as well as the demands of the society. Recognizing the impact of new technologies on the workplace and everyday life, today's teacher education institutions try to restructure their education programs and classroom facilities, in order to minimize the teaching and learning technology gap between today and the future. This restructuring process requires effective integration of technologies into existing context in order to provide learners with knowledge of specific subject areas, to promote meaningful learning and to enhance professional productivity (Tomei, 2005, p. 195).

However, many recent research studies on this theme shows that many institutions are failing to integrate technology into existing context. Bauer & Kenton (2005) stated in their study that although teachers were having sufficient skills, were innovative and easily overcome obstacles, they did not integrate technology consistently both as a teaching and learning tool. Reynolds, Treharne & Tripp (2003) also underlined continuing problems in the adoption of ICT by teachers and stated the need for further research on how ICT can improve education.

Turkey also made innovative attempts to increase ICT use of teachers. Building 2802 ICT classrooms in 1999 and 3000 ICT classrooms in 2005, providing laptops for teachers' project and building large "National Education Portal" project (2005) is just some of these attempts carried out by Ministry of Education in order to increase ICT use in Turkey. On the other hand, although the potential of technology has been valued early on and ICT use is increasing, the extent and nature of ICT usage in Turkish educational institutions is still very varied and in many instances limited.

Regardless of the quantity of technology placed in classrooms, the key to how those tools are used is the instructor. The majority of instructors believe technology usage is important for teaching, however, lack confidence and understanding during integration process. Furthermore, instructors should possess the skills and competencies essential for designing, delivering and evaluating instruction, since "Successful integration of technology requires not only the knowledge of the technology and its potential use but also the skill to plan and execute a good lesson (of which the technology is only a part)" (Painter, 2001, p. 23). When technology usage is aligned with the instructional goal, where technology is integral to teaching, successful integration might be succeeded. . Otherwise, the use of technology alone is not a sufficient indicator of integration. Therefore, "teacher educators need to place instructional technology education within the context of teachers' work in the classroom" (Mayo, Kajs & Tanguma, 2005, p.12). Wang, Ertmer & Newby (2004) concluded about this topic "…as our future teachers achieve high confidence levels for technology implementation, meaningful technology use can come closer to being the norm, rather than the exception, in our K-12 classrooms" (p. 242). Deaney, Ruthven & Hennessy (2003) also considered three major points for using ICT: the need for wider skills for effective use of tools, the need to focus on the power of technology and the need to shift familiar patterns of classroom interaction by introducing technology (p. 161).

Given the importance of access to technology, technology-competency and effective integration of technology, an understanding of how instructors and pre-service teachers in a faculty of education perceive technology can help institutions of higher education to successfully integrate, in relation with the current ICT usage. Desiring

technology-competent teachers for 21st century classrooms, we have to inquire the utilization of technology in teacher education institutions (Yildirim, 2000, p. 481). Understanding the factors contributing to the utilization of technology and the possible relations of these factors will lead us to educate technology-competent teachers. Under the light of these facts, the main purpose of this study was to examine factors that contribute to preservice teachers' utilization of technology and suggest recommendations regarding to the effective utilization of technology.

METHOD

Educational institutions should train teachers who are technology-competent and who effectively use and integrate technology into their teaching activities. This study aims at drawing an understanding of how instructors and pre-service teachers in a faculty of education perceive technology can help institutions of higher education to successfully integrate, in relation with the current ICT usage. Thus, the following research questions were proposed:

1. What is the current provision of technology utilized by both instructors and pre-service teachers?
2. What are the anticipated technologies and activities that preservice teachers require?
3. What are the preservice teachers' perceptions pertaining to computer and technology facilities provided to them?
4. What are the instructors' perceptions pertaining to technology usage in teaching activities?
5. What are the obstacles that instructors faced during technology integration process?

Subjects

All the accessible members of Faculty of Education, who were voluntarily participated, form the participants of this study. Accessible number of participants with their percentages was given in Table-1.

Table-1 Accessed participants of Faculty of Education

	Total Number of Participants	Accessed Number of Participants	%
Administrators	6	6	100
Instructors	25	24	96
Students	558	304	55

Instruments

Researcher developed two questionnaire forms; one for academic staff and the other for preservice teachers have been used in order to obtain data. The questionnaire form for academic staff contained 71 items, in which 26 questions addressing ICT usage, 8 questions addressing factors encourages technology usage, 21 questions about obstacles and 18 questions about self-perceived competencies. The student's form consisted of total 46 items, where 22 of them were about what sort technologies preservice teachers prefer to use and how often they use ICT and 19 of them were about the views of preservice teachers on ICT based on rated and 5 rated likert type scale. Descriptive statistical techniques such as frequency (f), percent (%) and mean (X) were used for analyzing data.

FINDINGS

Demographics

The demographic data about accessed academic staff and preservice students is below.

- According to departments, the percentages of preservice teachers were as follows: Computer and Instructional Technology Department 18,1 %, Elementary School Mathematic Teaching Department 15,5%, Turkish Language Teaching Department 8,6%, Foreign Language 24%, Elementary Education Department 17,8% and Preschool Education Department 13,5%.
- The distribution of student according to grades were; Elementary education 1st grades 39,5%, 2nd grades 35,5%, 3rd grades 16, 4% and the 4th grades 7,6%.
- The percent of female students were 80,3 while the male students' percent were 15,5. 81,6% of students from Faculty of Education have own home computers with 54,9% Internet connection.
- The 35,5% of subjects pointed out that they used computer less than one hour daily, and 15,5% of them used 1-3 hours and only 4,6% of them used longer than 5 hours in a day.
- 17, 4% of participants mentioned that they have been computer less than one year, and 25% of them have been used it for 1-3 years, 18,8% of them have been used it for 3-5 years and 33,6% of them have been used computer for over 5 years.

Perceptions of Preservice Teachers

It is necessary to provide one computer for every 6 students in a classroom setting for effective and efficient usage of technology. However, the existing settings are far from this reality and there is only one computer available for 12 students. The board, printed materials and overhead projection are widely used technological tools in classroom settings. The educational software is used very rarely in- and out of classroom. These results imply that the conventional instructional methods and technologies have been used and confessed in classroom settings unlike new approaches.

The 25% of preservice teachers stated that the instructional media have been used efficiently in the courses of educational faculty they study. They maintained that academic staff use mostly board (99%), and overhead projectors (93%) printed materials (93%) during the courses. They pointed out that computers (85%), TV and video (70%) and overhead projectors (60%) should be used definitely and extensively during the courses.

The 87% of preservice teachers maintained that they would like to use electronic media for communicating with classmates and academic staff, however only 48% of them could use electronic media for these purposes. When preservice teachers were asked to rank the technologies they favored to use in class according to the importance, 27,3% choose "Computer Assisted Education", 16,1% preferred Internet/Web, 14,8% stated "Computer and Projector System" and 13,5% selected "Multimedia Computer" as their favored technologies to be used in classrooms. Preservice teachers were also asked to rank their preferences in terms of software. The results showed that the most favored software they want to use in their classrooms were presentations software (25,3%), Internet Browsers (13,2%), educational software (12,5%) and animations software (8,6%). Preservice teachers' thoughts on various topics can also be seen in Table-2.

Table-2 The Percentages of Responses of Preservice Teachers for Technology Usage

Technology Usage Levels	Always %	Rarely %	Never %
Technology is used adequately during the courses in the faculty	11,5	70,4	17,1
Students could be facilitated with necessary skills for using ever technology until they graduate	11,2	61,5	26,0
The courses in the faculty provide us with basic skills and knowledge for usage of computer applications	36,5	48,7	13,5
The academic staff support and direct us to use additional materials for courses	34,2	48,0	16,4

The 44% of preservice teachers stated that they have been facilitated with basic knowledge and skills for effective usage of computer applications while 26% of them believe that the courses relating to computer could response the needs of students' computer usage. Only 30% of students stated that they have adequate skills for usage of instructional technologies in the future profession.

25% of students underlined that the instructional technologies have been used effectively in the courses of faculty of Education. The majority of students (92%) pointed out they wish to attend the courses of academic staff who use instructional technologies in extensively. Unlike the courses, they prefer to use supportive materials such as Web pages, computer assisted applications, Internet and online tutors.

Students stated that they have chosen to use word-processing (72%) and Internet Browsers (62%) for computer and educational software. However, 86% of the students maintained that they have never used any database and 68% of them have never used any educational software until now. The most favorite software of students were; word-processors (70%), Internet Browsers (69%), electronic presentations (68%), animation software (66%), Web pages developing software (54%) and educational software (51%).

Perceptions of Instructors

Majority of academic staff pointed out that they needed for a classroom setting which is facilitated with ICT tools such as computer, projector, TV and video, overhead projector, Internet and other instructional technology. They mentioned that the standardization of technology in every classroom and some special classrooms with facilitated high technology might response their expectations about effective teaching.

Some of the academic staff maintained special expectations relating to their special fields. They stated that some particular laboratories such as language, mathematics education, multimedia, research and motor skills instruction, have to be established and organized for effective and freely usage of both academic staff and students. They added that increasing the numbers of tools per a student in field special laboratories would lead to

more effective teaching as well. They also pointed out that they used frequently overhead projectors, printed materials, Internet and computer for preparing and conducting a course.

The academic staff stated that they use computers firstly for communication (95%), secondly preparing examination and course material (92%), thirdly research in Internet (90%) and finally for making presentations (58%). The 45% of academic staff have participated into courses our activities relating to usage of technology previously. Almost all of the academic staff (99%) was willing and ready to participate in any course, seminar, and workshop about technology usage. 85% of these academic staff mentioned the importance of learning by doing and active learning methods in these courses. In addition, academic staff pointed out a need to be supported and informed professionally on usage of technology for the research activities.

The 87% of academic staff recognized computer as a supportive tool for instruction and other activities. 49% of them pointed out that they could use computer as an instructional medium and integrate it into curriculum easily. When instructors are asked to ranked the factors which encourages technology usage of instructors, they rated "Existence of plans and strategies of the faculty in order to diffuse the instructional technologies" as the first item, "The faculty should make investments for in-service training" rated as the second item, and "The faculty should make investments to technical infrastructure" rated as the third item.

When obstacles faced during the use of technology in the teaching-learning process were investigated, the results showed that the academic staff had not enough time for participating to professional development projects or activities due to hard schedule and scarcity of staff. Everybody agreed on the need for continuous development schemes for effective and efficient usage of technology. They pointed out necessity of informing academic staff permanently in the faculty for they could integrate technology into curriculum and use technology efficiently. It means that they pointed out in-service education activities such as seminar, workshops and so forth. Supplement of informative materials about technology usage and innovation were other important points made by academic staff.

Almost all of the academic staff were willing to use technology in their courses effectively. They expected to have more support in terms of infrastructure and in-service training. Having so many academicians in a positive attitude towards technology is a good thing for any institution. It is almost half of the way towards effective integration.

DISCUSSION AND CONCLUSION

The results showed that in general, both the preservice teachers and instructors are in favor of using technology in and out-of-class activities. This positive attitude is an important indicator of willingness and first step in effective integration. Almost all of the academic staff were willing and ready to participate in any course, seminar, and workshop about technology usage, which reveals the need for professional development. They also pointed out the lack of electronic classrooms. These are very common results of technology integration studies. As the technology changes rapidly and contribute all segments of society and science, both preservice teachers and instructors wish to use technology in every phases of their life besides their tenure expectations.

Preservice teachers stated their most favored technology as "Computer Aided Instruction" and most favored software as electronic presentation. Due to the fact that "…the incorporation of technology in the classroom does enhance actual student learning and that this relationship is moderated by student characteristics" (Krentler & Willis-Flurry, 2005, p. 316) the expectations of preservice teachers are so important. Although preservice teachers are willing to use technology, they think that technology is rarely used in classrooms and their expectations were not meet. Thus, they also underlined the inadequacy of lessons to facilitate them with necessary skills for being technology-competent teachers. The instructors also paid special attention to the inadequacy of the quantity and low quality of computer literacy courses provided with students in faculty.

Higher Education Council, which is a central administrative body for higher education in Turkey, has revised the curriculum of all departments of faculties of education, in order to meet the expectations of both students and instructors. This new curriculum, which will be implemented in term of 2005-2006, is an attempt to train technology-competent teachers besides many other expectations of effective teachers. Further research studies regarding the effects of the enhancements in new program should be conducted. On the other hand, constituting learning environments with technology is another important factor which affects the use of technology. Placing at least an overhead projector and a computer-projector system in each classroom will be an important attempt to ensure the diffusion and effective use of technology. The lack of modeling by professors, due to poor technology competencies of professors is the one which plays an important role in the effectiveness of the teacher education process (Odabasi, 2000). Thus, another important attempt will be to provide teachers with in-service training

opportunities about technology so that they may feel themselves technology-competent, develop confidence and become role-models. As a consequence;

- The quantity and quality of the lessons addressing technology usage should be increased,
- Teachers should be sufficiently educated by providing qualified in-service training opportunities, and
- Learning environments should be donated with the minimum necessary technological tools

are the most important attempts to diffuse the use of technology for teaching-learning purposes. Gibson and Oberg (2004) also reported that the potential usage of Internet as a learning tool has not been realized by both teachers and students and they added that "This outcome appeared to be the result of limited infrastructure support, difficulties in infusing Internet use into curriculum, and lack of appropriate teacher professional development" (p. 569). The research study conducted by Staples, Pugach and Himes (2005) also identified three scaffolds that appear to have a significant influence on technology integration: "alignment with the curriculum/mission, teacher leadership, and public/private roles for technology recognition" (p. 285). Yet another researcher Venezky (2004) concluded that "… both infrastructure and teacher competencies were critical for successful implementation of ICT in a school" (p. 15) after bringing together different cases in various schools. Furthermore, Rosenfeld and Martinez-Pons (2005) found in their study that "… competence in the use of technology in the classroom proved to be a direct function of the degree of technology utilization" (p. 145).

Of course these investments cannot guarantee the effective use and integration of technology. However, these efforts will decrease the number of obstacles faced. In their study about the envisioning the use of technology within their future classrooms done with a group of preservice teachers, Doering, Hughes and Huffman (2003) offered several suggestions like; "… offering opportunities to virtually observe technology-using teachers, placing students in decision-making scenarios, providing more access to technological tools in media laboratories …" (p. 358).

As a consequence, cooperation with technology experts as advisors and role models should be the first step to be taken. Without technology-competent role-model instructors, it is difficult to integrate the technology into curriculum and graduate technology-competent teachers. Besides, careful investments on both hardware and software should be planned in the long range. Thus, as a second step, all classrooms should be equipped with the necessary infrastructure and all students should be provided with access to media laboratories whenever they want. For the quality and quantity of courses, instructors should revise their lesson plans or prepare technology-rich lesson plans and try to integrate technology into curriculum.

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TEACHING USAGE OF EQUIPMENTS IN A REMOTE LABORATORY

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ABSTRACT:
Remote laboratories are technologies that aim to increase the effectiveness of educational programs. European Remote Radio Laboratory (ERRL) is an e-learning project for students, teachers and technicians who will use very important devices of a radio frequency laboratory remotely. As a solution we have developed an e-learning system which aims to support the ERRL learners while studying on how to use equipments in the system. The system is developed according to the electronic performance support system (EPSS) approach. An EPSS is a computer-based, well-structured system which improves the performance of individuals. It is an electronic infrastructure that contains, stores and distributes personal (individual) or corporate knowledge to enable people to reach necessary levels of performance in the fastest possible time and with minimum teaching support of other people. This paper discusses how the content for such a system is developed and how this content is interactively used in the EPSS platform. The technical details of the developed EPSS are also discussed in this study. We believe that this paper will help instructional system designers for designing different alternatives to improve learners' performance.

Keywords: Electronic Performance Support System, EPSS, Remote Radio Laboratory, non-linear instruction, e-learning.

INTRODUCTION

European Remote Radio Laboratory (ERRL) is an e-learning project serves for students, technicians and engineers who will use the devices of a distance access Radio Frequency (RF) Laboratory. There are several reasons for establishing such a remote laboratory. First the equipments used in this domain are very expensive and for many institutions it is not possible to establish such laboratories. Maintenance cost of these laboratories is also very expensive. The second reason is that, these laboratories can support very few students for their learning. Increasing the number of students that can get benefits of these environments is always an issue in this field. The third reason is that, while providing distance education programs, it is not easy to get benefits of these laboratories in distance. To address these problems the ERRL project is established. The aim is to provide access to the theoretical and particularly practical training and provide access to high-cost and high-technological equipments in radio communications fields via Internet.

One of the requirements in this project is that: the learners in the system should know about the equipments which they will use for studying experiments. Theoretical and practical background should be provided for the learners to be ready to use these equipments in the practical studies and experiments. However, generally, the backgrounds of the learners in such an environment differ. For some learners only a specific feature of equipment might be important where as for the others whole structure could be new. Accordingly, it is hard to pre-define a learning path and content that fit the requirements of all learners. They need to access this system whenever they need help, as long as they need help and they need to query information as much as they need.

We believe that, these requirements fit the purposes of an EPSS. Generally, the EPSS are developed to improve individual's job performance. In the literature there are not many studies showing the use of EPSS to improve students' performance. In that sense, the requirements of the ERRL project both needs support to individuals (technicians and engineers), while they are performing their daily work, and the students, while they are practicing the theories that they are studying during their classes. This paper discusses what an EPSS is, main goals, characteristics and components of it. This study also reports the requirements for an EPSS in the ERRL project. Structure of the EPSS developed for the ERRL project and the benefits of the system are also discussed.

BACKGROUND INFORMATION

There are many definitions and many views of EPSS. For example according to *McGraw (1993, 1994a, 1995)* an EPSS is an integration of artificial intelligence, hypermedia and learning support (CBT) to produce an integrated system that includes intelligent user interface, embedded training, a hypertext online help system and an intelligent advisor/coaching system. *Barker and Banerji (1995)* view an EPSS as a computer-based interactive guidance and information support facility integrated into the normal working environment of an individual or work group to facilitate and/or improve human performance, problem solving capability within some target application domain. According to *Barker et al. (1998)*, EPSS is a computer based environment which helps to improve the skill and knowledge on a particular work. They agree that, EPSS can be embedded with computer-based learning systems to be able to extend the efficiency and effectiveness of the learners on the skills and knowledge about the objective. From all these explanations the most popular and accepted one is *Gloria Gery's (1991)* explanation. According to her, electronic performance support system is an integrated electronic environment that is available to and easily accessible by each learner and is structured to provide immediate, individualized on-line access to the full range of information, software, guidance, advice and assistance, data, images, tools, and assessment and monitoring systems to permit job performance with minimal support and intervention by others.

MAIN GOALS OF EPSS

Despite the variations in definitions based on different views and perspectives, there are some common views on the major goal of an EPSS. *Gery (1991)* suggested that the goal of an EPSS is to provide necessary support to generate performance and learning at the moment of need. Learners have to reach the information or documentation needed at the moment of need while they are working. So, an EPSS is sometimes required to provide far more than traditional training. It is important to understand that, it is not learning, but performance. It is sometimes desirable to enhance someone's performance without necessarily promoting learning *(Bezanson, 2002)*. This means that EPSS is different from the traditional training model. In traditional training model, learners have to leave their work situations, go to get and receive training and return their works. According to Sleight, EPSS is used for *(Sleight, 1993):*

- Task structuring support: help with how to do a task (procedures & processes)
- Access to knowledge bases (help learner to find the information needed)
- Alternate forms of knowledge representation (video, audio, text, image, data)

CHARACTERISTICS OF AN EPSS

An electronic performance support system can have some or all the following characteristics:

Computer-based: EPSS is a computer-based system, which is what the "electronic" indicates in its name.
Access during task: EPSS provides information needed to perform a task at the time the task is to be performed (done).
Used on the job: EPSS provides information to learners at their workstations on the job, so that the learners can reach the needed information while doing their works.
Controlled by the learner: The learner decides when and what information is needed. No teachers to teach something, they learn by themselves, non-linearly. Motivation of the task is not done by others, the motivation is provided again by the learners themselves to accomplish their tasks.
Reduce the need for prior training: The easy availability of the information needed reduces the need for prior training. Also, in prior training, learners must learn linearly all the information to pick up the necessary ones. On the other hand, in EPSS just get the related parts.
Easily updated: The computerized nature of EPSS makes updating faster and easier than in other media such as, prints, video, audio..
Fast access to information: The learners must reach the information needed quickly when it is needed on the job.
Irrelevant information is not included: The learners access only the specific, discrete information needed at that instant, instead of going through loads of irrelevant information to find few details needed.

Allow for different levels of knowledge: EPSS must provide minimal information for those who do not want details. The detailed information can also be provided by other links or documentation for those who want.
Allow for different learning styles: EPSS also can provide varied learning styles for more optimal learning. The same information can be presented in visual, textual, and audio formats.
Integrate information, advice and learning experiences: An EPSS can integrate information, advice and learning experiences for the user. For example, the advisory system would ask the learner some questions about what he or she needs to accomplish, then would suggest which procedure to use.
Artificial intelligence: This characteristic is not very rare in EPSS systems right now, but in the future this property will also become widely used in the system.

All of these characteristics are not required to be included in one EPSS. However, some of them are key characteristics of an EPSS such as; computer-based system, access the information during task is performing, used on the job, is controlled by the learner and reduced the need for prior training. In our point of view, these five characteristics are necessarily needed in order to call the system as an EPSS.

COMPONENTS OF AN EPSS
An EPSS normally has at least the following six components *(Raybould, 1990a, b; Gery, 1991; Levin, 1994)*:

An advisory system: a system that must provide support for problem solving, troubleshooting, as well as decision support, analysis and decision-making.
A data/information base: a system that provides support for accessing and searching the information needed to perform a job.
A learning/training support facility: a system that provides support for self directed learning (non-linear) experiences that are task-related and flexible.
On-line help/reference: a system that provides on-line explanations, demonstrations, advice, references and alternatives for using the software.
Productivity software: a system to provide documentation processors, flowchart drawing tools, graphing tools, so forth.
An end-user interface: a system that provides the user to navigate easily on the system, to access easily the information that is searching, to advice quickly and easily.

These components are the basis of an EPSS. However, there are some different perspectives again. According to *Gloria Gery (1991)*, there can be some additional components such as assessment system, monitoring and feedback system. On the other hand, some of the researchers are eliminated some of these characteristics. For example, according to *Raybould (1990)*, EPSS has four components such as, advisory system, information base, learning experiences or support and productivity software. Accordingly, there is no consensus in the literature about the components of an EPSS.

ERRL PROJECT
Before discussing the requirements for an EPSS in the ERRL project, we would like to briefly discuss the general structure of the ERRL project. Figure 1 shows the main architecture of the project.

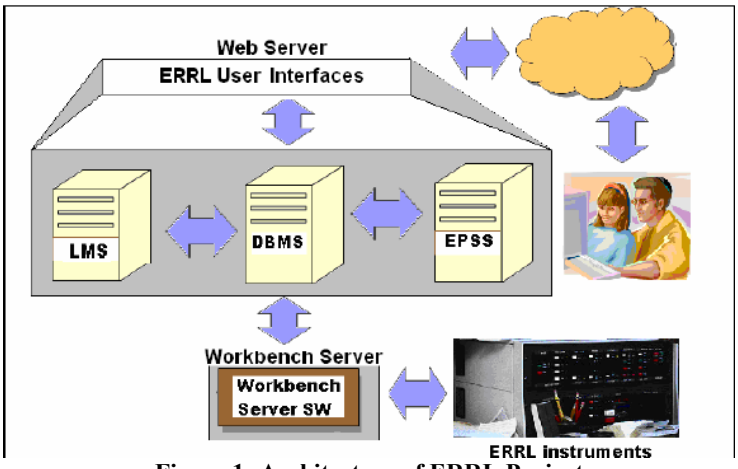

Figure 1: Architecture of ERRL Project

In this architecture learners; students, technicians and the engineers will use the system via web server and workbench server. ERRL user interface have three different services as shown in the Figure 1. First one is the Learning Management System *(LMS)*, is a software package that enables the management and delivery of online content to learners. Most LMSs are web-based to facilitate "anytime, anyplace, any pace" access to learning content and administration. Second one is Database Management System *(DBMS)*, to hold and manage all the necessary data according to the devices and the learners. And the last one is the Electronic Performance Support System *(EPSS)*, which stores and distributes personal (individual) or corporate knowledge to enable people to reach necessary levels of performance in the fastest possible time and with minimum teaching support of other people.

After all these steps the learners will be able to connect to the needed equipment via the workbench server real time, can perform some experiments according to their needs and get some outputs of their experiments to see the results. Learners are not obligated to learn any equipment's properties in detailed. They can only look for the necessary information, needed at the time of work or during the experiment process. These specifications lead us to develop an electronic performance support system.

REQUIREMENTS FOR AN EPSS IN THE ERRL PROJECT

To better understand the requirements of the ERRL-EPSS we have conducted a requirements analyses study on the possible users of the system. For this we have developed a questionnaire and implemented a group of people who are from our target population (the engineers, students and technicians) and who are voluntarily accepted to be involved in this study. The results are summarized in Table 1.

Table 1. Participants

Participant	# Part.	%
Engineer	39	23
Technician	15	9
Student	116	68
Total	170	

145 (85 %) participants are male, and 25 (15 %) of them are female. We have asked the participants, when they are learning a new subject which of the following methods do they prefer. Their responses are shown in Table 2. Most of the participants (53%) prefer to study with someone who knows the subject well. However, still some participants prefer to study their own (27%) or within a group (20%). These results show that participants usually need some guidance while studying a new subject.

Table 2. Preferred way of Studying (in groups or individually)

	# of Part.	%
Studying with someone who knows the subject well	90	53
Studying on their own	46	27
Studying within a group	34	20

Under this dimension, we also asked their preferred way of studying a new subject in the sense of linear or non-linear way of studying. Table 3 summarized results of the participants' responses on this question. 61% of the participants prefer studying a concept by starting from the beginning and go through the chapters one by one in the given order (linear way of studying). On the other hand 17% prefers reading the chapter(s) that they are interested in and never read rest of the content and 16% prefer to search on a keyword and than study on that specific topic only or reading the chapter(s) that they are interested in and never read rest of the content (non-linear way of studying). Only 10% have chosen to study on the examples and exercises and never read the rest of the chapters. Accordingly, 33% preferred non-linear instructions.

Table 3. Preferred way of Studying (in linear or non-linear order)

	# of Part.	%
Starting a concept from the beginning and go through the chapters one by one in the given order	103	61
Reading the chapter(s) that they are interested in and never read rest of the content	29	17
Search on a keyword and than study on that specific topic only	27	16
Trying to understand the end of the chapter examples and never read the rest	10	6

We have asked the participants to order their preferred way of studying a new concept by using a web site. We have multiplied the total number of first place choices by 3 and total number of second place choices by 2 in order to calculate the total scores. The calculated total scores are reported in Table 4. As seen from Table 4,

participants mostly prefer to go through the chapters in a given order (linear order) while studying subjects on the web.

Table 4. Preferred way of Studying on the web (in linear or non-linear order)

	Score
Go through the chapters in a given order one by one	349
Reach the information by means of keywords and read only the chapters you need	246
By means of questions and answers between the system and you	191

Table 5 shows the participants' preferences while performing experiments on computer. The score is calculated the same way as in Table 4. Participants mostly prefer interactive content. Figures on the subjects and story-based instructions follow it.

Table 5. Participants' Preferences while performing an Experiment on Computer

Preferred way of Instructions	Score
Interactive	1081
Figures on the subjects	622
Story based	611
Animations on the subject	543
Batch jobs	524
Games related with the subject	484
Several problems and exercises	464
Text-based instructions	417
Sound-based instructions	332

Main purpose of the ERRL project is to serve several people (students of the universities, engineers and the technicians) all over the world. Accordingly, the background levels of these learners are not the same. This requires a system that provides information for expectations of different learner groups. For example, some learners might be well informed about the equipment but just need to know the meaning of a button or such a specific information. On the other hand, others can start learning the equipment for the first time and need any detailed information of the equipment. Accordingly, the system then should provide different levels of information and let its users easily go directly to the requested part. Some learners will use the equipments while they are doing their daily work in their environment, while other will use the system while doing some experiments on their classes or for their courses. So, the system should be accessible any time while the learners are performing their tasks.

Learners are not necessarily had to follow each instruction in the system provided for different equipments. They shall be able to just reach the necessary information which is needed at the moment of the work. So the system must be self-directed and support also non-linear instructions. Another example is that, if an engineer tries to get some little information about the equipment, and if s/he has to go trough the whole the irrelevant content, it might also be annoying. The system must provide the needed information at the moment of need. On the other hand, the system should also support linear instructions and guidance as well. Because from the requirements analyses we understand that the learners prefer both forms.

The system will be used from different countries. So, it is not clear who will use the system and when use it. All the learners can connect to the system whenever they want to. Accordingly, the information-base of the system must also be reachable at the time of need. Another issue is that, technology is growing every day. The radio laboratory equipment can also be adapted to the technological changes. The system then can easily be updated according to the technological changes.

In the light of all these necessities, we have decided to develop an Electronic Performance Support System to be able to meet all these requirements. We believe that an EPSS can meet all these requirements.

INTEGRATED COMPONENTS OF EPSS IN THE ERRL

Based on the requirements analysis, our main aim for developing the EPSS for the ERRL project are to provide alternative forms of knowledge representation, interactive materials, figures and animations, guidance in the system, supporting both linear and non-linear instructions. We believe that, EPSS is also a powerful tool for improving learning performance of students. During the learning process, students can get help from the EPSS for quickly answering their questions as well as providing the information that they need (no more or no less).

Accordingly, our ERRL-EPSS includes the following components as shown in Figure 2. The advisory system builds on a question and answer system between the user and the computer.

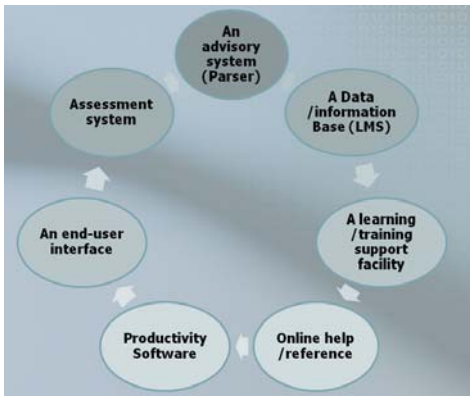

Figure 2: Components of EPSS

By means of a parser, the system gets some questions of learners about the studied equipment. The EPSS parses them and returns some advices in different formats. The advices generally cover the content that is related to the learner's question and previously defined in the EPSS information base.

EPSS information base is formed by means of a database which will support whole system (LMS Database) and the special database of the EPSS to hold some necessary information about the content provided through the EPSS. This structure builds the *data/information base* of the EPSS. The system will have *learning/training support facility* because it is not a linear system; it is a self-directed one. Also, our system includes an *online help/reference* that supports the users on how to use the software easily. It has also an *end-user interface* to be able to make easy to use of the software. The system is a *productivity system* because the learners will be able to get some outputs of the pilot experiments on the equipments' screens.

In addition to these six components, our system will also have an *assessment system* that provides education of individual knowledge or skill and level of expertise either prior to performing a job or in assessing learner competency as shown in Figure 2. The assessment part of the EPSS is developed on top of LMS assessment module.

EPSS STRUCTURE OF THE ERRL PROJECT

EPSS structure of the ERRL project is developed on the pilot part of the project which is designed for Vector Network Analyzer (VNA) equipment of the laboratory. The EPSS can be reached from anywhere in the ERRL project. When the user needs something to learn about the VNA for example then clicks a link to be able to pass the EPSS part of the VNA. Figure 3 is showing the VNA help system. The real picture of the equipments is used in the user interface panel and screen. The right side is blank at the beginning. If the learner needs to learn something about the buttons then it is enough to click on the buttons to see the explanations of that button *(See Figure 3, right part)*.

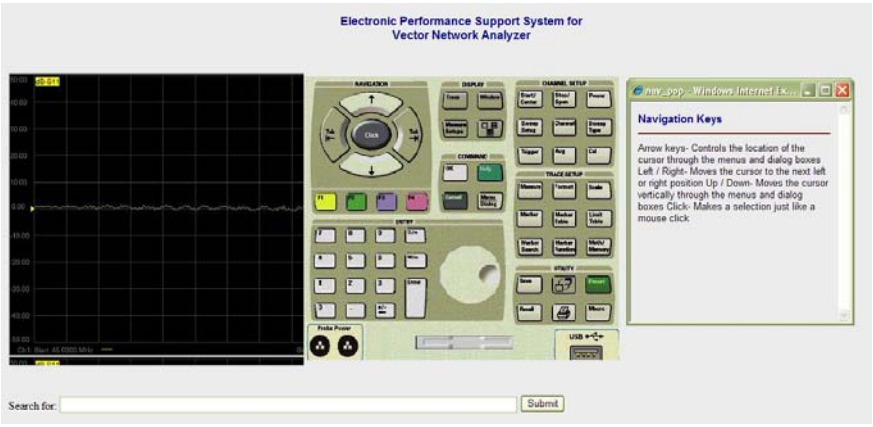

Figure 3: EPSS for ERRL (VNA Equipment)

If the user needs some specific information about the VNA, then s/he can write the keyword or the question to the text field of "Search for:" part of the system. When the "Submit" button is clicked the results of the search will be shown in the right part of the system again. These results will be as links in the form of text documents, videos, audios or the other forms that are available in the Learning Management Systems' (LMS) database. The system will also support the linear instructions and show the same content in a linear manner for the learners who prefer linear instructions. The content includes mostly interactive materials and animations to fit the requirements of the learners.

A basic experiment is also designed to practice how the equipment can be used within an experiment. This experiment is designed as a virtual one as simulating the real data that is previously taken from the equipment and stored in the database. The system supported by two databases. One is to manage the whole information about the equipments, which holds the documentations (specific DBMS of EPSS) and the other types of information and sends them when it is necessary (DBMS of LMS). Figure 4 shows the database structure of the EPSS.

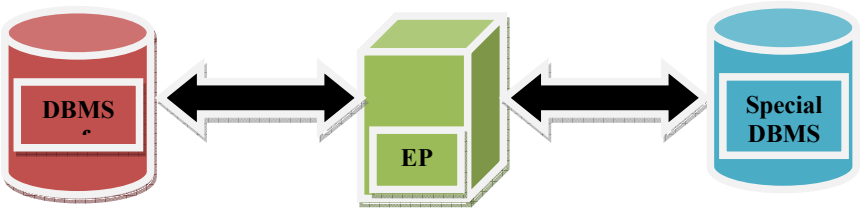

Figure 4: Database Management System Structure of EPSS

LMS Database Management System (DBMS) is integrated to the EPSS system. However, the special database is structured for the EPSS. It is to hold the necessary information on equipments of the laboratory. For the development of the EPSS, we used PHP and JavaScrits.

CONCLUSION AND DISCUSSIONS

In the technologically developing world, learning strategies are also changed rapidly. Nowadays, individuals also prefer to learn things by them-selves and in a non-linear manner. In this project, learning environments are supported by electronic performance support systems (EPSS). This study reports the main structure and components of the EPSS developed for the ERRL project. We believe that EPSS is a powerful tool which can be developed to support students' learning. We believe that in educational environments there are several places that an EPSS approach would fit perfectly. This will provide an alternative option for the learners to study on their own, on their preferred way of learning as well as request the amount of information that they need. Reach content in the EPSS also an opportunity for the learners to choose the best instruction from set of instructions in the same concept.

The EPSS of the ERRL project supports both the students and the people working in this field (the technicians and the engineers). Currently, the development process of the EPSS for different equipments in the laboratory is continuing. After the final development, the benefits of the EPSS approach for different group of users of the system (students, engineers and technicians) will be analyzed.

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THE STUDY OF RELIABILITY AND VALIDITY OF CREATIVE MATERIALS

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ABSTRACT
Creativity is an important ability in teaching-learning process because of its contribution to the struggle to cope with complex problems, to ensuring satisfaction in life and to the improvement in professional development. Especially, creativity is one of the essential abilities that teachers need in teaching-learning processes in their classrooms. It is crucial that prospective teachers' creative thinking skills should be developed and prospective teachers produce teaching materials in a creative way.

This study aims to develop a scale for the evaluation of the materials, which are developed by hand, or as technology-based, and of the materials, which are developed as project-based by prospective teachers in Instructional Technologies and Material Development (ITMD) Course or in other courses, in terms of creativity. First, the literature has been reviewed to determine the items that will take place in the 5-likert type scale, and a pool of items has been developed by the researchers.

A draft questionnaire has been prepared with the arrangement of the items created out of the pool with 5-likert type scale from strongly disagree to strongly agree statements and factor scores have been tried to be explained. The creativity of the materials is investigated in four categories- fluency, flexibility, originality, and elaboration. This questionnaire has been presented to the experts studying on creativity and material development in faculties of education to get their opinions. Items in the scale have been determined in the light of the results of the data. At the second stage, 4 experts have evaluated sample materials by the use of this scale, and reliability analysis has been carried out through the explanations for the harmony levels of these four experts.

Key Words: Creativity, Material, Instructional Technologies and Material Development.

1. INTRODUCTION

Defining the concept of creativity is difficult but it is one of the most charming concepts. Creativity is the discovery of the essence in every individual potential. It can be seen in a work of Leonardo da Vinci as well as in a housewife's home decoration. Being peculiar, inventing, multi-dimensional consideration, fluency in consideration and redefining are of the concepts that form creativity.

Creativity is an ability that can show itself in every part in human life and exist on every level. It exists from daily life to academic studies, it is a whole process causing of masterpieces in artistic area and also is an attitude and behaviour style (San, 1993). As David Bohm (1998) described it in his book named "On Creativity" as "according to me it is difficult to describe it", creativity is represented in different discipline areas differently. Creativity is described in the area of training as "discovery", in business world as "enterprise", in the area of mathematics as "solving problem", in the area of music as "performance" or "composition" (Reid & Petocz, 2004).

Although it is difficult to provide an agreement in the definitions that are introduced or to make a scientific definition, every definition is important due to bringing a different point of view to creativity. The emergence of creativity is generally considered and denoted by predicating on definition models that determine the boundaries and give denotation.

1.1. Creativity

Creativity is one of the important skills that human beings maintained interest on for a long time. This skill existing in every individual to some extent (more or less) is an important requirement from the social aspect together with the addition to individual life such as overcoming complex problems of life, providing satisfaction from life and self realizing. It is an undeniable truth that creative discoveries have an important place in developments of a society.

Researchers, who emphasize creativity a concept that should be considered at least at four-dimensional, specified that creativity can gain a conceptual integrity when the dimensions organized as a creative person, creative process, creative product and creative press are enlightened entirely (Money, 1963; MacKinnon, 1970; Woodman & Schoenfeld, 1989). In order to prove himself, creativity is a potential power that should be in the individual when encountered the suitable situation and exists in everyone more or less even if he is artist or scientist (Rouquette, 1992). A creative person is an individual who can find new solutions for problems and make a synthesis at complex and new level (San, 1979).

Self confidence, taking risk, being enterprising, being ambitious, high energy and being adventurer, curiosity, comfortable consideration, being diffirent, tolerance of mistakes, flexible and racial consideration, are some features that a creative person should have (Mac Kinnon, 1970; Arık, 1987; Rouquette, 1992; Zuckerman, 1979). Creative person investigates new areas, makes new observations, makes new predictions and makes new inferences (Amabile, 1983, 1996; Rıza, 1999; 2002; Williamson, 2001). According to National Advisory Committee on Creativity and Cultural Education (1999; 29), "creativitity is an imaginative activity fashioned so as to produce outcomes that are both original and value".

Creative press is related with the nature of the problem, physical environment and familiar environment. The uniqueness of the problem, the aptitude of the person to solve the problem, complexity, dimension and process are situational factors (Amabile, 1983; Torrance, 1995). The perception of the problem, the ability of describing the work more or less such as easy or complex, finding solution, finding different ideas, explaining only good ideas, make the right selection between the strategies, to dedicate oneself to working shows that creative situation exist in getting acquainted with the environment.

Some researchers consider creativity as a process. Wallas (1926) describes creativity as a process which is realized in four steps like; preaparation, incubation, illumination and verification. Torrance (1995: 23) also describes creativity as "the process of forming ideas or hypotheses, testing hypotheses and communicating the results". Swede (1993) describes creativity as a process of at least carrying two features such as 'unique' and 'valuable' rather than finding an answer to a question.

As it is stated before, creativity depends on innovation and discovered things different from individual, situation and process (Arık, 1987; Olson, 1999). Meanwile a distinction is usually made between the creative product and the creative process (Rıza, 2002; Russ, 2003). The creative product is the output of the individual, which can be judged as to the amount of creativity. If the product is new, suitable, useful and true or is valuable in useful, it can be defined as creative (Amabile, 1983; 1996; Glover, Ronning & Reynolds, 1989; Tezci, 2002). Creativity is the capacity of man to produce new ideas, opinions, discoveries or artistic objects which are valuable for social, moral, esthetic, scientific or technological use (Arık, 1987: 226) and also creativity necessitates reaching a new synthesis, to find new solutions and to display new and original products (Demirel, 2003: 226). Not being estimated before and being really original, being different from works which have been produced before by other people and confusing lots of people are the features that a new product or idea should consist (Lubart, 1994; Gürol & Tezci, 2001; Dikici, 2001; Yanpar, Koray, Parmaksız ve Arslan, 2004).

Although the general features of creativity and the process differ from person to person there are some common features that define creativity. They are fluency, flexibility, originality and elaboration as follows (Guilford, 1950; Torrance, 1968, 1974; Amabile, 1983; Weisburg, 1986; Paulus, 2000; Kincaid & Duffus, 2004):

Fluency: Fluency is the ability to generate a large number of ideas, consequences or possibilities, and having the ability to produce different ideas and hypothesis in related to the problems that engage the mind of a person. Fluency is the ability to produce lots of ideas in different dimensions and the ability to choose the valuable ones of these ideas for a specific purpose. Fluency is arranging the works which are various and detailed. Word fluency can be classified as an association that can be described as finding the synonyms of given words and is related with semantic ability, expression fluency that is the ability of express the meaning with different word groups and sentences, mental fluency that is the ability to produce ideas in order to provide some requirements (Guilford, 1950; Torrance, 1968; Kincaid & Duffus, 2004).

Flexibility: Flexibility is ability to generate a vide variety of ideas, and adapting to changing conditions, thinking independently, and creating different aspects. It is thinking and producing without staying stable, unlike others. It is an ability of changing point of view, redefining problems by making more concrete and abstract when necessary. Spontaneous flexibility is defined as thinking independently although it is not necessary. Individual, thinking creatively, can quickly pass from one category to another. For example, he can think the brick, a building material, as a weighing tool or rocket. Adapter flexibility is useful for problems that need

unusual sollutions. Sometimes problems seem to be able to be solved by traditional methods. But these methods cannot be used for each problem (Torrance, 1968, 1974; Amabile, 1983; Weisburg, 1986)

Originality: It is defined as producing extraordinary answers, being original in thoughts and actions, and sometimes breaking taboos of community and evading regulations. It expresses individualism, uniqueness, and quite dissimilarity. It also expresses being unique, being new, and presenting the best. It requires being different or being unusual, unlike others. Obvious responses are not considered original. It expresses forms that others could not do and could not reach in advance (Amabile, 1983; Weisburg, 1986; Paulus, 2000; Kincaid & Duffus, 2004)

Elaboration: It expresses to get down to the details of suggested opinions and to be detailed in opinions, thoughts and actions (Sungur, 1992; Yanpar et al., 2006). Elaboration provides depth of thoughts. It is reflected multiple responses involving of detail.

1.2. Teaching Materials

Modern life makes individuals to use their creative thinking skills for solving social, individual and professional problems in a high value appearing complicated, and to bring up creative products. Although communities aim to raise individuals that harmonize with their prejudices, laws and values, it is important to improve creativity from science to education system in each field in rapidly changing world. Teachers have an effective role on students to reveal and improve their creative potential. Teachers have to be creative in many subjects like choosing different education approaches, using different kinds of techniques and methods together related to their theme, choosing and preparing required materials. For this reason it is important for teachers to get students' creative skills improved, and educate them in way of preparing creative materials to study in education faculties. Especially nowadays when creativity is important required skills for teachers in teaching-learning process, it is important for prospective teachers who study in faculties of education both to improve their creative thinking skills and to develop education materials related to their areas in a creative way before appointed as teachers.

Education materials, in general meaning, are every kind of materials that are used making teaching-learning process effective (Yıldız, 2004). The purpose of using of materials is sometimes modeling among sub-themes related to main themes, sometimes activating learning, sometimes concretizing hardly understandable themes, depicting, etc. So every kind of supportive object towards activating education and improving productivity can be called as educational materials. Material that is used for any action can be a symbolic system that serves emphasizing and conveying meanings (Goodman, 1978) or it can be a computer (Salomon, 1993) program that makes possible to create and manipulate mental strategy or symbolic and mental objects that aim to trasfer information to others as well The important thing is to make synthesis for materials in a creative way for students to improve their acquisition in courses. While making this synthesis, one should act in frame of a forementioned collective features that indicate creativity. Prospective teachers should be independent in process of forming creative materials (Yanpar, et al., 2006). He should also think by making connections, should express his thoughts easily, should examine, research and critics.

1.3. Rubric

Rubric, one of the authentic evaluation tools, can be used for evaluating formed materials. Rubric is a tool that consists of criterions that define student's performance, and is useful for evaluating performance in different levels with these criterions. It consists of criterions that were developed for evaluating students' examinations, folders, homework and performances. According to Goodrich (1997) rubric, as being an evaluational tool, is listing criterions for a piece of work. Gronlund (1998) defines rubric as an evaluational instructions or evaluational guide that defines characteristic features about a certain subject related to performance in different levels and is used for deciding related to performance.

Rubric can be used for evaluating actions such as oral projects (class discussion, acting, interview, oral representations, story telling, debate, etc.), products (collection or exhibition, preparing brochure, preparing poster, publishing newspaper, etc.), experiment reports, drawing graphic, solving problem, preparing project, researching and writing studies (writing letter, petition, story or composing), artistic studies (Tezci, 2005; Kubiszyn & Borich, 2003; Gronlund, 1998).

Rubric can be used in different kinds of performance or success areas. For example, it can be used in products that include poet, article, graphic, exhibition, picture, photograph; in mental processes such as organizing and using ability; in noticeable performances like typing computer, playing an instrument, oral explanation, using a

tool; and in behavior and social skills like mental practices, group studying skills, and self recognition (Kubiszyn & Borich, 2003; Danielson & Abrutyn, 1997).

The aim of the study is to develop a scale for the evaluation of the materials prepared manually or technology-based and developed as project-based in point of creativity in "Instructional Technologies and Material Development" course or in other courses.

2. METHODOLOGY

2.1. Development of the scoring guideline

In this section, explanations about the process of preparing the teaching materials and the analysis during this process are discussed.

2.1.1. Identification of the dimensions that is going to take place in the scale

This step is a phase in which what kind of things will be in the content of the study are determined. Grading rating scale should specify what the students should know, think and do; and it is also a phase to determine what the performance will look like. The definitions in the content should involve clear and familiar explanations. Relativity should be minimized (relativity should be lowered to a minimum level) (Wolf, 1999; Aschbacher, Koency & Schacter, 1995; Burstein, Koretz, Linn, Sugrue, Novak, Baker & Lewis, 1996).

In the grading rating key, the content should have the qualification of differentiating a well-qualified study from a less qualified study. The validity of the rating tools that are used in evaluating the studies is the process of increasing the evidences which will suplement the suitability of the results inferred from the reactions such as a specific task, assignment and a study (Marzano, 1996; Moskal & Leydens, 2000). As the validity depends on the purpose of the evaluation, what is going to be put forth from the reactions of the students should be defined clearly and appropriately. In this context, what should take place in the content of the scale is determined in the first step.

The scale was started to be done firstly by finding out the indicators of performance that is appropriate for the criterion such as fluency, originality and enrichment of the material. In order to find out the structure of the scale, firstly, 63 items was prepared as a result of a literature analysis. It was given great importance to the fact that the features such as creativity, fluency, flexibility, originality and enrichment dimensions were handled all in one or at least one- two features were mentioned together. 5 point-likert type scale (ranging from 5= strongly agree to 1= strongly disagree) which consists of 50 items was prepared by removing 13 materials totally. 2 of these materials were found out to have no relation with the creative material after it was undergone a specialist's judgement and the remained 11 items seemed to be the repetition of the materials. After marking, the extracted materials were put into the scale again in order to keep control over the application phase of the scale. By in terms of the difficulty in writing the adequate controverse expressions in the scale and the fact that it is not suitable to write negative expressions in the grading rating scale, this method was used (Finson & Ormsbess, 1998; Goodrich, 1997; Burstein et al., 1996).

The prepared scale was applied to 112 specialists in both the field of material development and creativity (they give "teaching Technologies and material development" courses at the ducation faculties and they carry their studies on creativity). Factor analysis was applied to the data gathered by means of the scale, which has been applied. Factor analysis is a procedure that tries, by combining numerious variables, to find few new variables, which are unrelated and conceptually meaningful. The correlation among the items involved in the sclae proves that this tool measures only a single factor (Crocker & Algina, 1986; Bryman, 1999). In this context, in order to calculate the correlation among the items constituting the grading rating scale, content structure of the grading rating scale structure which was going to be used to score the materials had been defined.

At first, unrotated principal components analysis was applied to the data gathered from the scale and conducted to examine construc validity of the scale. In the analysis done on 50 items, there were 10 factors whose eigenvalue was found to be 1 and higher. The variance that was revealed by the whole elements was 71.58 but the variance revealed by 50 elements, which standed under the factor was 39.33. Factor-structure coefficients equal to or greather than .35 of the items was selected. In the analysis done, 9 items below .35 were taken out of the scale and it was found out that 41 items were functioning well.

An Unrotated Principal Components Analysis was done with these 41 items. As a result of the analysis, the factor number was decreased from 10 to 6 and the variance value of the first factor was increased to % 46.37. After warimax rotation, the first factor loading was 32.43. Bartlett's Test Sphericity is found to be 3440,283 and Kaiser-Meyer-Oklin Measure of Sampling Adequacy value .906. The total variance explained by 6 factors was

found to be %66.67. The elements that remain functioning after the scale factor decoding has been categorized under 6 titles (groups) according to their relation with each other (Table 1). By gathering these items together, the researchers themselves defined which titles would be in rubric taking the items in the scale into consideration. According to this; the titles has been grouped under 6 categories. These are: (1) audio-visualelements, (2) content, (3) language and expression, (4) functioning, (5) form-shape and (6) colour. The items involved in these titles and their factor-structure coefficients are given in Table 1.

Item No	Items	Factor loading
	1- Audio-Visual Items	
2	The visual elements in the material should enrich the education (learning) process (picture, photograph, schema, icon, diagram…etc)	,856
3	The audio elements in the material should enrich the education (learning) process.	,825
4	The visual elements in the material should be in close interaction with each other.	,797
5	The material should be supported with striking visual elements.	,797
6	The material should involve suprising stimulus that will attract the learners' attention and keep it alive.	,746
8	The cognitive learning aids (icon, hint…etc) should be used adequately and in different levels.	,744
15	Many more visual and audio elements should be used in the material.	,433
18	The topic should be sufficient. Besides, the content should be presented with the elements that can cater to different sense organs.	,871
26	Innumerable surprising elements which will not irritate the learners should be used.	,618
44	Although ready-made elements are used in the material, their using objectives and functions should be new and useful. (They should be pedagogically suitable)	,794
60	The use of each element shouldn't be the imitation of another.	,580
	2- Content	
24	The content should be authentic but it should also be presented in different context.	,625
29	New ideas should be involved in the material.	,805
32	The material should consist of live sensory explanation.	,574
48	İn terms of creativity, the material should show that the person having prepared it has understood the issue in depth.	,762
51	The content should be presented in various ways different from the others.	,568
50	The content in the material should be rich and detailed.	,412
59	The material should offer solution to at least one of the difficulties in the content area which it aims to teach.	,656
62	There should be an extraordinary connection or relation among the issues in the material.	,484
63	The synthesis of the content in the material should have been reached.	,734
12	The material should be backed up (supported) by the examples which don't exist in other materials.	,588
	3- Language And Expression	
13	Important items in the material should be emphasized in a different way.	,715
16	The material should consist of fewer texts but more rich concepts that reflect the issue.	,622
36	The writing style should be original.	,396
49	The words should be used in a rich way.	,472
	4- Operating (Functioning) And Mechanism	
14	The material should provide the learners with lots of various learning opportunities.	,807
25	The material should be designed in such a way that considers different learning preferences of the learners.	,789
27	The material should make learning enjoyable.	,792
30	The material should attract the attention of the target group and keep it alive.	,857
41	The prepared material should serve for different aims and requirements.	,647
46	The material should force the imaginative power.	,674
47	The material should be the most suitable material in terms of learning.	,708
54	The material should be handled in a way that will rescue the learners from various thinking patterns.	,761

56	The materials should be previously-used.	,821
	5-Form	
7	The material should be easily followed and understood by the learners.	,761
9	The material should involve various design patterns (formal-informal balance or symmetrical or irregular balance) in terms of form.	,623
33	In the material, the issues-elements should be presented by using wide variety of approaches-elements.	,658
45	The material should put forward a new style.	,533
61	Each single page shouldn't seem like a repetition of the other.	,403
	6-Color	
10	In the material, primary subtractive and additive colours should be used together in a suitable way.	,637
20	The figure and background colors should be used in a way that is unfamiliar and different from the colors used in other materials.	,374

As seen in Table 1, 18th item has the highest factor loading (.87) and the 20th item has the lowest factor loading (.37) the spectrum of the total expressions (data) in the sub-dimensions that are formed by the items in the scale is; There are totally 11 items in the sub-dimensions of audio-visual elements, 11 items in the sub-dimension of content, 4 items in the sub-dimension of language and expression, 9 items in the sub-dimension of functioning, 5 items in the sub-dimension of form and 2 items in the sub-dimension of colour.

After the Factor analysis, in the third phase, the sub-dimensions had been formed by benefitting from the items that remain functioning and the content of performance expressions that would take place within these sub-dimensions was defined. Later, by using all these data, a grading rating scale key was prepared.

The principal element (e.g. number, practicability) which were emphasized in each item and which were important in terms of creativity was taken into consideration and they were changed into expressions of performance. Each title in the scale serves as the sub-dimension of the grading rating scale key. Besides, the performance expressions that are formed by all the materials in this dimension show the basic level of this dimension and the quality (characterictics) of a perfect study. For this reason, the level formed by the performance expressions resulting from the items that remain functioning after the factor analysis expresses the study with highest-level creativity (the most creative study). According to this; the levels that are involve in these 6 dimensions and; that are said to be the most and the least creative studies in each single dimension are written in Table 2.

Table 2: Rubric

Score	1- Visual And Audio Elements
5	1- The visual and audio elements used in the material aren't used before or even ready-made elements are used, they are adequate, different, new and useful in terms of use, onjective and function. 2- They involve numerous elements that enrich the learning process and that have mutual interaction. 3- The content is presented with many surprising elements (visual and audio) that will attract the attention of the learners.
4	1- In the material ready-made materials is used. However, each element is different, new and useful in terms of use, objective and function. 2- The elements are interactive, adequate in number and they enrich the learning process. 3- The visual and audio elements used to present the content attract the attention of the students and they are backed up with (supported) surprising elements from time to time.
3	1- Although not frequently, there are items that are used for the first time.the purpose of use, functions of the elements are beneficikal but not new. 2- The elements are innumerable and they help the learning process. 3- Although the visual and audio elements used in order to serve the content have an ordinary usage, they are interesting.
2	1- The elements that are used in the material are the materials that are used before. They are scarce in number, but they are functionally different and beneficial. 2- Although not to a great extent, the elements make significant contributions to learning. 3- The elements used to serve the content are insufficient to attract the attention of the learners and the material used to present the content isn't coherent with the content.
1	1- The elements used in the material aren't sufficient in number, there aren't any differences and the benefit in using a material isn't taken into concentration. 2- The elements in the material do not contribute to learning process.

	3- The material that is used to present the content is ordinary and it dosn't reflect any relation and coherence.
	2- Content
5	1- The content is presented with authentic, rich in different contexts, detailed and extraordinary connections and new ideas. 2- A content synthesis that shows a deeper understanding of the issue is formed it includes a lively sensory explanation with a different style and variety. 3- The content comes up with solutions to more than one difficulty in the content field which the teaching has targeted.
4	1- The content is presented with highly detailed and new ideas. When presenting it, authentic and different contexts are taken into consideration. 2- A content synthesis that shows the content is prepared and it includes diversity. 3- The content comes up with a solution to at least one or two difficulties in the content field targeted by the teaching.
3	1- The content is presented with authentic, rich, detailed and different contexts. 2- A synthesis that reflects the concepts of the issue is formed. 3- The content comes up with a solution to at least one problem (difficulty) in the content field targeted by the teaching.
2	1- Although its presentation is detailed, it doesn't involve authenticy, richness and new ideas. 2-it shows that we have reached and understood the concept of the issue. 3- The content comes up with a solution to at least one problem (difficulty) in the content field targeted by the teaching.
1	1-The content is devoit of detail, authenticity and richness. İt cannot surpass the well-known form of it. (it is a repetition of its well-known form) 2- The concept of the issue is ordinary. 3- The content doesn't come up with a solution to any problem (difficulty) in the content field targeted by the teaching.
	3- Language And Expression
5	1- The important parts in the material are emphasied in a different way with rich concepts and without any other materials. 2- The meanings of the words are rich and the writing style is handled in a original and unique way.
4	1- The important parts in the material are emphasied in a different way with rich concepts and without any other materials. 2- The meanings of the words are rich and the writing style is handled in a original and unique way.
3	1- Although all the important parts (points) in the material are emphasized, they are away from being rich and the use of the concepts are different from those in other materials. 2- The meanings of the words are sometimes rich and the writing style is original from time to time.
2	1- The important points in the material are emphasized. The concepts are used carelessly. 2- The words are used carelessly and the writing style is ordinary.
1	1- The concepts and the words are devoit of emphasis and they are ordinary. 2- The words are used carelessly and the writing style is ordinary.
	4- Operating (Functioning) And Mechanism
5	1- The material is the most beneficial one in terms of learning, it makes learning enjoyable and it facilitates learning by attracting the attention of the target group. 2- It gives answers to different needs and targets. It is practicle and provides different learning opportunities. 3- It relieves the learners from thinking patterns and it has the mechanism that will foster imagination.
4	1- The material is suitable in terms of learning and it attracts the attention of the target group. 2- It provides answers to the needs and goals of the learners and it has the practicability, which will enable learning. 3-It has the mechanism that will foster imagination and relieve the learners from thinking patterns.
3	1- The material is suitable in terms of learning and it attracts the attention of the target group. 2- It focuses on limited learning opportunity, it is practicle and it is far from taking the needs and expectations of the learners into consideration. 3- Although it doesn't aim to foster imagination, it has the meachanism to release the earners from specific thinking patterns.
2	1- Although the material is the beneficial in terms of learning, it doens't make learning enjoyable and it doesn't attract the attention of the target group. 2- It is focuses on learning opportunity only with a single perspective. The needs and expectations are not taken into consideration.

	3- Although it doesn't aim to foster imagination, it has the meachanism to release the earners from specific thinking patterns.
1	1- The material cannot foster learning and it cannot attract the attention of the target group. 2- It doesn't focus on any learning opportunity. The needs and expectations are not taken into consideration. 3- It has the meachanism that is suitable for the samiliar thinking patterns.
	5- Form (Shape)
5	1- The material has various design forms (such as formal-informal balance) that the learners can follow and understand easily. Each page is different from one another. (it has a unique quality) 2- The issues and the elements are presented with different approaches. They have different styles.(they are unique)
4	1- The material has various design forms (such as formal-informal balance) that the learners can follow and understand easily. From time to time, the pages are like the repetition of each others. 2- The issues and the elements are presented with different approaches. They have different styles.(they are unique)
3	1- The material has various design forms (such as formal-informal balance) that the learners can follow and understand easily. The pages are like the repetition of each others. 2- The issues and the elements are presented with different approaches. They have similar styles with the others.(they are not unique)
2	1- The material has various design forms (such as formal-informal balance) that the learners may have difficulty in tracing. The pages are like the repetition of each others. 2- The issues and the elements are presented with nearly similar approaches. Their styles are not different.
1	1- The material has various design forms (such as formal-informal balance) that the learnerscannot understand. The pages are copied (replicated) from other pages. 2- The issues and the elements are always presented with similar approaches.they don't have styles.
	6-Colour
5	Primary subtractive and additive colours used in the material are coherent (harmonic) all together and they have a completely different style of use. The colours of both figure and background are used in a familiar way which is different from the ones used in other materials.
4	The colours used in the material are all effective and they have a completely different style of use. The colours of both figure and background are used in a way that is generally unfamiliar.
3	The colours used in the material are all effective but they are used in a way that is used in other elements from time to time. The colours of both figure and background are used in an unfamiliar.
2	The colours used in the material are all effective but they are used in a way that is generally used in other elements. Although limited, the colours of both figure and background are used in an unfamiliar.
1	The colours used in the material are far from effectiveness. They have a familiar and ordinary usage. The colours of figure and background are ordinary and they have familiar usage.

As it is seen in Table 2, the guideline is composed of 6 sub-dimensions with 5 different levels. 5 depict the most creative material, 4 creative materials, 3 mid-level creative meaterial, 2 low-level creative materials and 1 uncreative material.

In the 4th phase of the study, it is tried to specify the consistency level among the scorers in order to determine reliability. In this context, 5 persons including 4 specialists in material development (2 researchers and 2 specialists other than the researchers) and a specialist who only studies on creativity gave grades in 6 sub-dimensions to the materials prepared by students with 15 different caharacteristics in teaching technologies and material development course. The correlation among grades and Cronbach's Alpha coefficients of each material was calculated with 6 sub-dimensions of the graduated rating key. As a result of the analysis done;

- In the sub-dimension of visual and audio elements, the highest correlation was found to be .92 (second researcher and the **S**pecialist **S**tudying on the **F**ield of **C**reativity [SSFC]) and the lowest one .79 (first researcher and the **F**irst **S**pecialist in **M**aterial **D**evelopment [1-SMD]) .The Cronbach's Apha coefficient was .96.

- In the sub-dimension of context, the highest correlation was found to be .93 (first and second reserachers); the lowest one 74 (first researcher and the SSFC) and the Cronbach's Apha coefficient .94.

- In the sub-dimension of language and expression, the highest correlation was found to be .88 (Second Researcher and SSFC) the lowest one .74 (**S**econd **S**pecialist in **M**aterial **D**evelopment [2-SMD] and SSFC) and the Cronbach's Alpha coefficient .91.

- In the sub-dimension of processing and mechanism, the highest correlation was found to be .91 (Second Researcher and SSFC), the lowest one .77 (First Researcher and 1-SMD) and the Cronbach's Alpha coefficient .94.
- In the sub-dimension of form, the highest correlation was found to be .89 (1-SMD and SSFC) and the lowest correlation was found to be .75 (first researcher and 2-SMD) and the Crobach's Alpha coefficient .92.
- In the sub-dimension of colour, the higest correlation was found to be .87 (first and second researcher) the lowest one .72 (2-SMD and Second Researcher) and the Cronbach's Alpha coefficient .90.

Although the correlation proves whether the relation among the grades was positive or meaningful, it doesn't enable us to distinguish the quality of a study with 3 or 4 grades in a 5-graded key. Namely, while a scorer gives 3 to a study, other scorer may give 4. In this situation, the correlation is high as well as there is a significant difference between a 3-graded and a 4-graded study in terms of creativity.

In this context, 3 materials which has the highest ($\overline{X}$=4.6), middle ($\overline{X}$=2.6) and the lowest ($\overline{X}$=1.2) grades in the mean average used ın the research and calculated as a result of the gradings of 5 scorers were selected and they were given grades by two independent researcher and the correlation percent was observed (Koretz et al., 1993; Burstein et al., 1996).

As a result of the grading done, the grades that were given to the materials with three different characteristics and the correlation among the grades with the highest, middle and the lowest quality of creativity is given in Table 3.

Table 3: The Correlation Grade Table in Terms of Two Scorers and Qualities.

Quality		Visual and Audio Elements	Content	Language and Expression	Processing And Mechanism	Form	Colour
The most Creative	1.Scorer	5	5	5	5	4	4
	2. Scorer	5	5	5	4	5	3
Middle	1.Scorer	3	4	3	3	3	2
	2. Scorer	3	3	3	4	4	3
The lowest Creative	1.Scorer	1	1	1	1	1	1
	2. Scorer	1	1	2	1	2	1

As it is seen in the Table 3, it may be said that the correlation between the basic quality of rubric and the dimensions of a creative material is high in general. Although the materials selected to be the most creative in the sub-dimension ıf colour gets the highest grade by two scorers, rubric cannot reach the specified grade level.
A creative study possesses the quality of a creative product in terms of all its sub-dimensions. As each scale element defined with factor analysis is composed of related elements, the correlation between the grades related to each sub-dimension of a graduated rating guideline can be used as a scale of reliabilitity. In this context, the correlation between each sub-dimensions of the scale prepared was scrutinized.

In the analysis done; the highest correlation was in the sub-dimensions of "visual and audio elements" and "processing and mechanism" with the value of .89, the lowest correlation was found as .77 in the sub-dimension of content and colour. The Cronbach's Alpha value was calculated as .92.

3. RESULT

The increasing interest in performance evaluation in the evaluation of the student success is the urge to carry out this study. The necessity of evaluating with a reliable and valid evaluation instrument such as portfolio evaluation and project evaluation that shows improvement especially in recent years in evaluating the tasks and assignments constitutes the basic principle of the study. Keeping this idea in mind, it is aimed to develop a tool, which will enable us to grade the materials prepared by the students objectively in terms of creativity.

In this context, a rubric was prepared in order to be used in the evaluation of the students' materials in terms of creativity. First of all, the elements that define the basic qualifications which a creative material should possess, were found out by talking with the field specialists and scanning the literature. The qualities were transformed into 5 point-likert type scale and it was subjected to factor analysis in order to determine the basic qualities that could take place in the scale after it was applied to the specialists.

As a result of the factor analysis, it was found out that 41 items were closely related to the same factor (KMO = 0,906 and the declared total variance 66,677) and they were collected in 6 sub-titles. In this way, the qualities of a well-qualified study were found out and the sub-dimensions of the scale were determined.

Keeping the specified materials determined with factor analysis in mind, a grading rating scale was prepared. As these are creative materials, in the study, it is aimed to define the dimensions of a less creative material, in other words, its sub-dimensions.

In the determination of the sub-dimensions, three researchers defined with what qualities the most creative; creative; mid-creative; the least creative material and the material, which was not creative, could be identified (based on the materials gathered from the scale) and then a rubric was prepared after the dimensions done by these three researchers were combined. In terms of the reliability of this key, the coefficient alpha of the 41-item scale was .90 and the correlation between grades above that was .93 at the top and the lowest correlation was found as .72. The correlation among the values gathered from the total grades that these 5 evaluators gave to each sub-dimension of the grading rating scale in terms of reliability is scrutinized. The lowest correlation in the analysis was .77.

In such kind of grading rating scale, the generalizability of the rating guideline is important. (Koretz et al., 1993; Burstein et al, 1996) However, in this study, we put up only with the correlation among the sub-dimensions of the rubric as a scale of the generalizability of the students' studies. In such studies, the grades and correlation that can be used as a scale is important in terms of generalizability (Koretz et al., 1993; Shavelson & Webb, 1991; Burke, 1999). But in this study, the fact that there is only one sample of the students' studies and there aren't any grades related to the creative material pertaining to the sampling has prevented the analysis in this aspect.

The prepared grading rating scale possesses the usable qualities as a reliable and valid tool in the sub-dimensions of audio- visual elements, content, language and expression, processing and mechanism, form and final colours in the evaluation process in terms of the teaching materials' creativity.

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