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SPECIAL ISSUE: **Current Issues and Future Trends in Computer-Assisted Language Learning and Teaching**

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FROM THE GUEST EDITORS

The research base in CALL is extensive, but in a world where technology is continually changing, there is a constant need for updated findings adapted to latest developments in teaching technologies. The goal of this special issue is to present some of the most stimulating research on current issues and trends in computer-assisted language learning and teaching.

The articles selected for inclusion here provide some insight into current trends in CALL research. In conducting a meta-analysis of research over the past decade of CALL one article determines that the majority of articles related to CALL have focused on computer-mediated communication and intercultural learning, and accordingly an article is included here examining discourse patterns in an online community of practice. Another article in this issue addresses the need to integrate technology into programs supporting foreign language teaching/learning, whereas others suggest how this might be done more specifically. One article for example investigates certain impacts of mobile technology on enhancing learning and another suggests how students might use search engines to gain insights into collocations in English. A further three papers concern how technology might enhance vocabulary learning and retention, and a final paper addresses articulation disorders in the Turkish language.

More specifically, the aim of the first paper presented in this issue is to determine the discourse patterns of chat logs of an online community of practice, Webheads, in terms of social presence. This ethnographic study analyzed five randomly chosen chat sessions that has been held and recorded weekly in a year. The study was guided by three research questions: (a) what types of categories are observed (b) what the most frequently used functions of social presence are, and (c) what the least frequently used functions of social presence are. In this study, Rourke et al.'s (2001) taxonomy was used as the coding list, to which the researchers added 5 functions for social presence they deemed missing in the original taxonomy. This study may help other researchers to analyze text-based CMC environments from the perspective of social presence.

The second paper included in this issue aimed to examine the effects of web-based supplementary material on intermediate level English language learners' vocabulary retention by presenting them the vocabulary items through spaced repetitions. In this study, learners were exposed to three modules that included 10-12 target words. In this investigation of the impact of WEBVOCLE on learners' vocabulary retention, the changes in the level of retained words through the process were assessed through a one–way ANOVA test. The results of the study demonstrate that WEBVOCLE is effective for retention of the words that had been previously taught in the classroom.

The third paper in this issue examined the perceptions of foreign language teachers of use of computers for administrative and teaching purposes in foreign language teaching. Responses of 50 English language instructors at the preparatory school of a university were collected through questionnaires. The findings indicate that teachers

use computers more for purposes such as taking attendance, writing lesson plans, and recording or calculating grades. The authors suggest that Preparatory school administrations take measures to integrate technology into their programs to support foreign language teaching/learning and to raise teachers' awareness through in-service training courses. Another suggestion supplied relates to establishing an Instructional Media Center within the school which might help teachers both in integrating technology into their courses and making good and efficient use of technology whilst teaching in class. It is recommended that such a media center supply language teachers with materials for the improvement of specific skills and provide them with instant assistance whenever they need.

The next paper presents a computer aided package developed for articulation disorders in the Turkish language and the results of a study which investigated its effectiveness. The findings suggests that articulation problems of students can be corrected through the use of computer aided materials. The results also suggested that use of such articulation programs may have positive effects on students' social, psychological and academic experiences.

The fifth paper in this special issue made use of a post-test experimental design to analyse the effects of different types of oral feedback techniques on the number of words recalled. The study group consisted of 6-7th grade students from different schools in Istanbul, Turkey. Results indicate that explanatory feedback is more effective than confirmation feedback. However, findings also suggest that confirmation feedback could be as effective when other feedback variables are manipulated such as trial number and repeating the question each time. The study concluded that rather than written feedback, an animation technique (a flashing animation) is more effective in strengthening attention, perception and word association.

The sixth paper extends the use of mobile phones, which are already in use for communication and entertainment, to education. Three different study modes (mobile, handout, and web) were used as a supplement to regular classroom instruction in order to explore the comparative effectiveness of supplementary materials delivered through 3 different means: mobile phones, web pages, and handouts in improving learners' pronunciation of words. Four words a day were delivered to the participants by using one of the modes that their group belongs to. The results suggest that students who were sent multimedia messages via mobile phones studied supplementary materials more than students who studied the web- and paper-based materials and this frequent supplementary study helped to better pronunciation of words. Moreover, findings obtained from the interview data indicated that students believed that the use of mobile phones for pronunciation learning is very effective. The implications of this study point to a possible new pedagogy in teaching pronunciation afforded by innovative technologies.

The seventh paper provides support for the Interaction Hypothesis by investigating whether negotiation of meaning in synchronous computer-mediated communication facilitate language learners' subsequent ability to recognize and produce new vocabulary and whether observed differences hold up over time. The results of this study provide empirical support for the Interaction Hypothesis. It is suggested that

such online activities that are integrated into the language curriculum rather than being an add-on component can be enhanced through embedding further revision of the newly learned vocabulary items into the design process. It is recommended that mimics, gestures, and keystrokes could be captured through the use of usability lab technologies.

The next paper in this issue examines research and trends in CALL published in selected academic manuscripts during 1990-2008. Citation analysis was used in this study to investigate documents related to CALL that are indexed by the Web of Science, Scopus, EBSCOhost and ScienceDirect. Documents identified were analyzed according to the document types, language of documents, documents from the sources, years of publication, authors, the most frequently used keywords, citation by the years and the highly cited documents. More then three fourths of the documents published in the sources during 1990–2008 were articles (n = 998, 76.24%). This was followed by conference papers (8.71%). English was found to be the most frequently used language in journals related to CALL. Findings revealed that vast majority of articles related to CALL focused on computer-mediated communication and intercultural learning. The majority of most frequently cited articles were classified as descriptive research. The second type of research design in the rank was developmental research, and third was experimental research design.

The last paper aimed to provide evidence that it is possible to help the learner through Google search engine to access, select and/or produce the correct collocation out of a number of potential collocational candidates. The study suggests that use of search engines may provide L2 students with more information about which collocational candidate to choose from. Google search may help language learners to make the most of these tendencies with repeated exposure and diverse contexts in refreshing and invigorating ways. Foreign language learners can test alternatives against search results making informed comparisons and they can detect subtle differences.

All of these studies are valuable in shedding some light on different aspects of CALL. Yet, in order to enhance our knowledge of computer assisted language teaching and learning, more research investigating new and exciting possibilities offered by innovative technologies is called for.

We are grateful to the authors for their patience during the review process and for their efforts in producing such high quality papers taking into account the reviewers' comments. We would like to thank Ali Şahin, Editor-in-Chief, for giving us the opportunity to edit this special issue and for being very supportive throughout the process. We are also indebted to the referees who are listed below. With their time and valuable feedback they greatly contributed to the success of this work.

Gölge SEFEROĞLU & Vance STEVENS

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Social Presence in Synchronous Text-Based Computer-Mediated Communication

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Abstract

Problem Statement: In recent years, the substantial technological development in various online environments has been used in educational environments. However, these online environments are still new for many teachers, researchers and students. Thus, researchers have attempted to determine the discourse patterns of these environments from different perspectives. Social presence is one of these dimensions; however, there has been little research on social presence in synchronous CMC environments. This study will contribute to the literature on social presence in synchronous CMC environments.

Purpose: The purpose of this study was to determine the discourse patterns of chat logs for the online community of practice, Webheads, in terms of social presence.

Methods: This is an ethnographic study with computer mediated discourse analysis. Chat sessions have been held and recorded weekly since 2001; however, this study specifically covered chat log data between August 2007 and August 2008. Five randomly selected sessions were analyzed. Three research questions were considered: (a) what categories are observed (b) what are the most frequently used functions of social presence, and (c) what are the least frequently used functions of social presence.

Findings and Results: It was concluded at the end of this study that five new functions should be added to the twelve in the previous taxonomy. These are "link sharing," "gratitude," "leave taking," "pre-sequential leave taking" and "reply leave taking." The most frequently used functions are found to be the "vocatives," "expression of emotions" and "asking questions" and the least used functions are found to be "referring to others' messages," "quoting from others' messages" and "continuing a thread."

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Conclusions and Recommendations: Teachers and students may benefit from an awareness of the discourse patterns of a synchronous text-based CMC environment as they relate to social presence. Teachers may become more conscious of the use of social presence functions in their online courses. Moreover, since five additional functions were observed, researchers may use this updated taxonomy in their own discourse analysis from the perspective of social presence. In thinking about further research, because an online community of practice may be composed of both new and old members, it might be interesting to observe the differences between these two groups.
Keywords: Social Presence, Discourse Analysis, Computer-Mediated Communication, Synchronous Text-Based Communication

As technology develops and access to the Internet becomes more common, new communication media are coming on the scene almost every day. Computer-mediated communication (CMC) tools can utilize text, voice, video or any combination of these. Many companies are working to offer faster and more user-friendly tools or updates for these types of communication, often providing them for free to Internet users.

By means of such innovations, people have had new opportunities to move their social groups to Internet environments and create online communities. In such communities, people come together through the Internet eliminating problems of geographical distance and diminishing time zone differences. Using the new tools for Internet and new online environments, researchers have attempted to compare real communities with online communities and to describe the patterns of these environments.

One of the issues studied so far is that of social presence. While this topic has been studied in face-to-face communication environments, with the emergence of online communities of practice, social presence has come under study in online environments as well (e.g. Gorham, 1988; Christophel, 1990; Whiteman, 2002; Tu, 2002). In noting that "recent thinking views social presence as one variable among many that contribute to building a sense of community among learners at a distance" (p.57) Aragon (2003) regards social presence as one of the most crucial factors in making online communities successful.

Gunawerdana and Zittle (1997) define social presence as "the degree to which a person is perceived as a 'real person' in mediated communication" (p.9). In other words, it's the process in which we become comfortable and present ourselves socially. For example, when we enter a new community, we might feel uneasy for a period of time because we don't know the people there. However, over time and through interactions with other members of the community, we become more comfortable as we develop our social presence there.

This is especially true in educational environments. When a new student enters a classroom or when a teacher encounters his/her new class, a period is necessary until the members of this class get to know one another and feel comfortable in the classroom. This period is important for the success of that classroom. But in online

communities, without facial expressions and gestures, this period is somehow different. In this paper, this period was analyzed in an online community of practice called Webheads, while they were in conversation in the synchronous text-based computer-mediated communication environment, Tapped In.

Online Communities of Practice

There are many online communities of practice on the Internet; however, before giving examples of these, we should establish the criteria that constitute a community of practice. Lave and Wenger (1991) describe a community of practice as a group of individuals who share a repertoire of knowledge about and ways of addressing similar (often shared) problems and purposes. On his website, Wenger defines communities of practice as "groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (http://www.ewenger.com/theory/index.htm). Thus, sharing a common environment is not enough for being a community of practice; a common interest or passion for something is required. Therefore, the people living in London can be called a community, but they are not a community of practice. On the other hand, members of an online group created to share experiences regarding the study of English can be considered a community of practice because they share a common objective and come together regularly to interact with the other members on a particular topic.

Wenger defines the characteristics of communities of practice as (a) the domain, (b) the community and (c) the practice. The domain is the common interests and objectives of the group. However, it is not enough that members of the group have a common goal. There should also be interaction among the members and they should perform activities related to their goals. The final characteristic of communities of practice is that the members of these groups are not merely a group of people who share the same ideas, interests and goals, but they also should be practitioners. They aim to improve their practice as a result of their interactions.

'Webheads' is a community of online language teachers and learners who have been meeting in various cyber-venues since 1998. In 2001, Vance Stevens created a Webheads in Action session for the second annual Electronic Village Online (EVO; http://evosessions.pbwiki.com/) to bring participating teachers up to speed with the latest Web 2.0 and CMC tools. Forming initially as a Yahoo Group, Webheads have grown from just a few dozen participants in the first EVO course in 2002 to over 700 in 2008. Since then, Webheads participants have produced PhD dissertations that describe the group in detail (Simpson, 2003; and Steele, 2002). Johnson's (2005) dissertation defines the group specifically in the context of a community of practice. Webheads members are participating in dozens of other similar communities and interacting with like-minded peers throughout cyberspace (Dieu and Stevens, 2008). In addition, WiA has held two international online conferences (Webheads in Action Online Convergence, or WiAOC). At the second of these conferences, Etienne Wenger suggested in his keynote presentation that Webheads had helped him to refine his definition of a distributed community of practice (http://streamarchives.net/node/56). Webheads

community members have been meeting each Sunday at noon GMT at Tapped In (http://tappedin.org) since the group began in 1998. Participating members are sent email transcripts of each session. These transcripts were used to derive the data for this study.

Social Presence Research

There have been several studies related to the different dimensions of social presence. Tu (2000), who attempted to determine the relationship between social presence and the social learning theory, stated, "Whether one examines CMC as a learning environment or is applying student learning and socio-cultural learning to the CMC environment, social presence must be examined while considering the three dimensions of social presence, social context, on-line communication and interactivity" (p.34). A year later, Tu (2001) analyzed the transcripts of Chinese students using these three dimensions. He presented the problem of Chinese students studying in the United States by conducting research with six graduate students enrolled in an online course. He collected data using three different types of CMC – e-mail, bulletin board and real-time chat. At the end of the study, he determined many variables regarding the characteristics of online communication tools and students' attitudes toward the tools used for CMC. He concluded that "the degree of social presence can be altered and cultivated with different strategies and different participants" (p. 57).

Rourke, Anderson, Garrison and Archer (2001) applied content analysis for asynchronous text-based computer conferencing and defined the codes for a content analysis of data in terms of social presence. In this study, the three categories of affective, interactive and cohesive were used, along with 12 indicators of these categories. For data, two transcripts were compared in terms of social presence. However, the main purpose of this study was to evaluate efficacy of an asynchronous CMC tool for analyzing social presence.

Richardson and Swan (2003) explored the role of social presence in an online learning environment by having 369 students, who had completed an online learning course, fill out a survey. The variables of the survey included students' perceived learning, students' perceived social presence, students' satisfaction with the instructor for the course overall and students' perceived learning and perceived social presence for individual activities. The study indicated a significant relationship between the students' perceived social presence and their perceived learning.

Na Ubon and Kimble (2004) collected data using bulletin boards so that the communication analyzed was asynchronous. A content analysis was applied to the transcripts in order to measure the degree of social presence from the perspective of tutors and students as determined by the social presence elements of students' and tutors' perspectives, affective responses, cohesive responses and interactive responses. Four modules in this online course. It was found that affective responses were most used in the first module, which indicated that students needed the highest level of affective responses at the building stage of a community.

Along with the developments in rendering technology, these studies have been conducted not only in text-based CMC environments but also in three-dimensional virtual environments. Hauber, Regenbrect, Hills, Cockburn and Billinghurst (2005) tried to discover differences among the social presence levels in desktop two-dimensional videoconferencing, desktop three-dimensional videoconferencing and face-to-face communication in a real environment. They showed an increase in the level of social presence from two and three-dimensional mediated to real face-to-face communication. The results suggest that social presence can be strongly felt by participants in computer-mediated communication.

Finally, Nippard and Murphy (2007) examined social presence in a web-based synchronous secondary classroom. They used Elluminate Live (http://www.elluminate.com) to collect data for three months in six courses including social sciences, science, art, music, technology and mathematics. Certain features of Elluminate were accepted as the criteria for evaluation. Direct messaging, which is text based, and audio chat were compared in terms of social presence. They found that teachers and students relied on different tools for providing affective, interactive and cohesive responses. While teachers preferred audio chat, students preferred text messaging. Moreover, social presence occurred more in the context of digression, and not during the actual delivery of the course.

Researchers have been interested in the occurrence of social presence in both synchronous and asynchronous online environments. Most researchers have analyzed the content of both the Internet environments and face-to-face settings. With developments in technology, more settings, like bulletin boards, online conferences and three-dimensional virtual environments were analyzed in terms of social presence. In these studies, when the influence of environments on the levels and types of social presence were examined, it was found that there is a relationship between the environment and social presence levels. Social presence levels increase when CMC environments are used and teachers' and students' preferences for the tools change when social presence is taken into consideration. However, little research has been done in this area and more studies, especially longitudinal studies, are necessary.

Methods

This study aimed to elucidate patterns in terms of social presence in the synchronous CMC environment, Tapped In. The chat logs of the CoP, Webheads were used as data.

Research Questions

The research questions of this study are as follows:

1. What are the discourse patterns in a text-based synchronous CMC environment in terms of social presence – affective responses, interactive responses and cohesive responses?

2. What are the most frequently used functions of social presence in chat logs of an online community of practice?

3. What are the least frequently used functions of social presence in chat logs of an online community of practice?

Significance of the Study

Most social presence research has been conducted in asynchronous environments and data collection has typically lasted for one term, or approximately three to four months. This study can be taken as a longitudinal study as the members have been interacting since 1998 and the analyzed data included a year of chat logs – from August 2007 to August 2008. Moreover, the communication was synchronous CMC and little research has been conducted in synchronous CMC environments.

Research Design

This study is an ethnographic study with computer-mediated discourse analysis. It is an ethnographic study because the data was not collected under a laboratory setting; rather a natural environment was observed in which discussion sessions were held by group members. The participants connected to the environment and participated in discussions with the other members of Webheads and the logs of these chats were used as data sources of this study.

Computer-mediated discourse analysis (CMDA) is a term first coined by Herring in 1995 (Herring, 2001). Herring (2004) asserts that linguists are becoming interested in "… language structure, meaning, and use, how these vary according to context, how they are learned, and how they change over time" as the Internet provides new online platforms, new varieties of discourse and new media for communication.

These new environments require new methods for analyzing discourse. Herring (2004) points out that "scholars of computer-mediated behavior need methods for analyzing discourse, alongside traditional social science methods such as experiments, interviews, surveys, and ethnographic observation." Therefore, CMDA is considered to be an appropriate linguistic discourse analysis method from three perspectives. Primarily, it deals with the discourse patterns, which are produced consciously or unconsciously; as the main aim of discourse analysis is to discern these unseen patterns in discourse. Additionally, "discourse involves speaker choices" (Herring, 2004). For example, participants can choose not to type or to use emoticons in CMC environments. The participants' activity is not predetermined; tokens occur simultaneously. Finally, the features of technology shape discourse, i.e. computer-mediated communication, so researchers are interested in whether the medium changes the communication or not.

In this study, the chat logs of members of an online community of practice, Webheads, were analyzed in terms of social presence with intent to determine the functions and frequencies of social presence categories in these chat logs. According to Herring (2004), CMDA can be applied to four domains or levels of language: structure, meaning, interaction, and social behavior. The interaction level includes turn taking, topic development and other means of negotiating interactive exchanges. Since the foci of this study are the interaction and social behavior, CMDA was considered appropriate for the analysis of the data.

Participants

Participants in the chats were all members of Webheads. In all, 39 members joined the discussion sessions; however, not all of the members stayed connected throughout all of the discussions. Because the sessions lasted two hours, some of the members joined at the beginning; some left early or joined toward the middle, and some were connected throughout the session.

Of the 39 participants, some joined all of the sessions, while others only participated in one or more of them. The numbers of participants in each session ranged from 11 to 14.

Table 1

The Number of Participants in Each Session

Session #	Participant #
Session 1	12
Session 2	11
Session 3	14
Session 4	14
Session 5	12

Instrument

Tapped In has been used by the members of Webheads for regular, but informal, meetings each Sunday starting at noon GMT since 1998. Tapped In is an online community whose environment is designed specifically for educators. Tapped In is browser-based, so there is no need to download any setup or installation files (apart from the Java for the text chat). Users can log on as guests or members. To become a member, a user fills out a form and then is able to create a personal office for themselves, join communities within Tapped In, and receive emails automatically for each chat session in which they participate.

Tapped In attracts a wide spectrum of educators. Many are interested in English language teaching, but there are also teachers in the fields of art, history, math, science and so on. However, some students and educators come here to improve their English proficiency. Many Webheads members meet online every Sunday starting at noon (GMT) to discuss their ideas and share their information about the use of technology in language classes.

Data Collection Procedure

Webheads members are aware and implicitly agree that data from emailed transcripts might be published on a webpage; for example at (http://akayoglu_s.web.ibu.edu.tr/webheads.htm), where each log file was assigned a sequential number. In order to randomly select a subset of subjects, a pseudorandom number generation software program (http://www.graphpad.com/quickcalcs/index.cfm) was used select five of

the 42 chat logs posted. Later these chat logs were imported into the data analysis software Hyper Research and coded, as explained in the following section.

Data Analysis

Data was analyzed using the coding taxonomy below:

Table 2

The Model and Template for Assessing Social Presence

Category	Indicator
Affective	• Expression of emoticons
	• Use of humor
	• Self-disclosure
Interactive	• Continuing a thread
	• Quoting from others' messages
	• Referring explicitly to others' messages
	• Asking questions
	• Complimenting, expressing appreciation
	• Expressing agreement
Cohesive	• Vocatives
	• Addresses or refers to the group using inclusive pronouns
	• Phatics, salutations

These coding categories were originally determined by Garrison et al. (2000) as *emotional expression, open communication* and *group cohesion*; and were later modified by Rourke et al. (2001) into the categories *affective responses*, *interactive responses* and *cohesive responses*. In this study, Rourke et al.'s taxonomy was applied and modified further. These categories are explained briefly in the following section.

Affective Responses. As defined by Nippard and Murphy (2007), this category is primarily related to the affective elements such as emotions, feelings, mood, closeness, warmth, affiliation, attraction and openness. In text-based CMC environments these can be observed through emoticons, humor and jokes.

Interactive Responses. This category studies interactions such as replies to other members of the community. Complementing, expressing appreciation or agreement, and asking questions are also included in this category.

Cohesive Responses. The final category is strongly related to building and sustaining a sense of group commitment. In this category we find salutations, greetings, leave-taking, addressing someone with his/her name, using inclusive personal pronouns, other phatics and vocatives.

Intercoder Reliability

In order to ensure the reliability of the coding, Cohen's Kappa was calculated. The coders were asked to code the data according to the given taxonomy. Cohen's Kappa value was found to be .78; and according to the Landis and Kappa (1977), values greater than .75 indicate excellent agreement.

Findings

The findings were organized according to the three research questions. The first question was to discover discourse patterns in the data in terms of social presence (affective responses, interactive responses and cohesive responses). In the analysis, 2555 turns were coded as social presence and 17 categories of social presence were observed (see Table 3). The Model and Template for Assessment of Social Presence created by Rourke at al. (2001) was used to add an additional five functions to this list: "link sharing," "gratitude," "leave taking," "pre-sequential leave taking" and "reply leave taking." Except for the link sharing, which can be taken as an interactive response, these functions can be categorized as cohesive responses, which help group members build a sense of community. In the following table, the frequencies of functions in each session are given.

Table 3

The Results of the Data

	Session 1		Session 2		Session 3		Session 4		Session 5		**TOTAL**	
	n	%	n	%	n	%	n	%	n	%	n	%
C- Vocatives	147	5.75	128	5.01	136	5.32	159	6.22	129	5.05	699	27.36
A- Expression of Emotions	75	2.94	85	3.33	99	3.87	58	2.27	77	3.01	394	15.42
I- Asking Questions	68	2.66	76	2.97	83	3.25	76	2.97	83	3.25	386	15.11
C- Phatics, Salutations	48	1.88	47	1.84	55	2.15	67	2.62	47	1.84	264	10.33
I- Complementing - Expressing Appreciation	20	0.78	37	1.45	41	1.60	51	2.00	30	1.17	179	7.01
E- Link Sharing	28	1.10	15	0.59	8	0.31	33	1.29	24	0.94	108	4.23
A- Use of Humor	15	0.59	9	0.35	46	1.80	6	0.23	15	0.59	91	3.56
A- Self Disclosure	36	1.41	31	1.21	5	0.20	12	0.47	2	0.08	86	3.37
I- Expressing Agreement	7	0.27	21	0.82	25	0.98	17	0.67	13	0.51	83	3.25
E- Gratitude	10	0.39	21	0.82	5	0.20	25	0.98	12	0.47	73	2.86
E- Reply Leave Taking	13	0.51	10	0.39	20	0.78	4	0.16	12	0.47	59	2.31
E- Pre-Sequential Leave Taking	13	0.51	6	0.23	15	0.59	3	0.12	8	0.31	45	1.76
E- Leave Taking	8	0.31	6	0.23	7	0.27	3	0.12	10	0.39	34	1.33
C- Addresses or refers to the group using inclusive pronouns	2	0.08	4	0.16	7	0.27	7	0.27	10	0.39	30	1.17
I- Continuing a Thread	4	0.16	3	0.12	2	0.08	0	0.00	3	0.12	12	0.47
I- Quoting from others' messages	2	0.08	1	0.04	3	0.12	1	0.04	0	0.00	7	0.27
I- Referring explicitly to others' messages	1	0.04	4	0.16	0	0.00	0	0.00	0	0.00	5	0.20
TOTAL	497	19.45	504	19.73	557	21.80	522	20.43	475	18.59	2555	100.00

Note: The letters in front of the categories, A, C, I, E, stand for Affective Responses, Cohesive Responses, Interactive Responses and Extra Responses added by the researcher respectively.

The second research question concerned the most frequently used social presence categories. It can be clearly seen that "vocatives" are the most frequently used social presence function and that there is a large difference between the number of vocatives (699) as compared to the other functions (vocatives were 27.36% of all

functions observed). The second most frequently observed function was "expression of emotions" (394 times, or 15.42% of the observed functions) and the third most frequently observed function was "asking questions" (386 occurrences or 15.11% of all functions observed).

The third research question was about the least frequently used functions of social presence. As shown in Table 3, the least frequently used function was "referring to others' messages" followed by "quoting from others' messages" and "continuing a thread." The number of occurances of these functions were very low when compared to the other functions. "Referring to others' messages" was observed only for five times (0.20%), "quoting from others' messages" was observed seven times (0.27%) and "continuing a thread" was observed 12 times (0.47%).

Discussion and Recommendations

This study aimed to determine the discourse patterns of the chat logs of the online community of practice, Webheads, in terms of social presence. The data were collected from transcripts of naturally occurring chats and analyzed by means of CMDA for answers to the research questions asked.

The first research question asked what discourse patterns would occur in these chat logs in terms of social presence using Rourke et al.'s (2001) taxonomy. While analyzing the data, it was seen that five additional functions were present. The first of these was "link sharing," where participants researched topics on the Internet while chatting and shared their links with the other participants, thus making others aware of their research and providing new information crucial for the communities. Another function added in this study was "gratitude." When participants thanked one another for any favor or for sharing information, this can be counted as "phatics" but the frequency of "gratitude" warranted making it a separate function. The rest of the newly added functions were "pre-sequential leave taking," "leave taking" and "reply leave taking."

In the current taxonomy, there is a function called salutations. When a session begins, all participants greet the others and these greetings were counted as the cohesive responses. Although all participants use leave taking before they leave the sessions, this was not taken as a function in the taxonomy. In this study, "leave taking" was added for this reason. Moreover, statements from someone when leaving varied widely. For example, participants prepared to leave might propose an excuse like "I have to leave and sleep." This was not categorized as leave taking but as pre-sequential leave taking. After that, the participants leave saying "Bye" and this is categorized as leave taking. When someone utters the final statement, he/she waits for a few seconds while the other participants reply to his/her leave taking with a response like "see you later." This was coded as "reply leave taking." These functions were added to the taxonomy in this study.

Moreover, the emoticons like ":)" ":(" were transformed into verbal statements as "VanceS smiles" and "ThomasLev nods" as a built-in feature of Tapped In. These

were commonly used in the chat logs (5.59% of all observed functions) and these were counted as "expression of emotions."

The other two research questions considered the most and the least frequently used categories in these sessions. As previously noted, "vocatives," "expression of emotions" and "asking questions" were most commonly used. Vocatives, addressing someone by his/her name, are crucial when there are more than two chat participants in order to avoid confusion about who is saying what to whom. Sometimes the addressee is clear but often omission of vocatives can be disorienting. This explains why vocatives were the most frequently used function in this study. The second and the third most frequently used functions, "expression of emoticons" and asking questions, were also important in discussion. The discussion unfolds as some members ask questions and others answer. Furthermore, people in a community enjoy expressing their emotions to make the environment more sincere.

The least frequently used functions were concerned referring to and quoting from others. In chat sessions, participants' messages do not disappear in time. The participants can easily go back to their transcripts and check them. Because participants do not need to quote previously posted messages, such tokens appeared infrequently in our chat data.

Conclusion

In this study, the researchers hoped to gain insights into the discourse patterns of a text-based CMC environment of the communities of practice, Webheads, in terms of social presence. During the analysis, using Rourke et al.'s (2001) taxonomy as the coding list, researchers added five functions for social presence they deemed absent from the original taxonomy. Finally, the most and the least frequently used functions were determined and reasons for their frequencies were addressed.

As mentioned in Akayoglu and Altun (2008), "teachers may direct their students to use the Internet for their language development in the target language. Before directing them to these places, they should be aware of the characteristics of these environments." Additionally, communication was found to be one of the perceived roles of school administrators regarding IT classrooms in schools (Akbaba-Altun, 2004; Akbaba-Altun & Gürel, 2008). This role should be extended to computer-mediated communication settings and tools.

Although social presence is one of the most important factors in creating a sense of community, there has been little research on this topic. This study may help other researchers to analyze text-based CMC environments from the perspective of social presence. Moreover, this study may help teachers and students create a greater awareness and make better use of these environments.

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Eş Zamanlı ve Metne Dayalı Bilgisayar Destekli İletişimde Sosyal Buradalık

(Özet)

Problem Durumu: Söylem analizi uzun yıllar boyunca çeşitli ortamların, metinlerin içlerinde var olan ancak yazılı olmayan kurallarını bulmak için uygulanmıştır. Günümüzde teknolojinin getirdiği yenilikler sayesinde yeni ortamlar ve metin türleri ortaya çıkmıştır. Artık yüzyüze iletişim kadar internet üzerinden gerçekleşen iletişim ve internet üzerinde meydana gelen yazı türleri de gün geçtikçe önem kazanmaktadır. Bunun sonucunda ise bu yeni ortamların ve metinlerin analizine gerek duyulmaktadır. Bu şekilde bu ortamların kendi içlerinde olan düzenleri ortaya çıkarılacak ve ortamın kullanıcılarına kolaylık sağlanacaktır.

Bu ortamların analizi birçok açıdan yapılmaktadır ve sosyal buradalık da bunlardan bir tanesidir. Ancak bu konu üzerine yapılan çalışmalar ya kısa süreli olmaktadır ya da eş zamanlı olmayan ortamların analizinde kullanılmaktadır. Bu çalışmada uzun süreli bir grubun eş zamanlı olarak gerçekleştirdiği tartışmaların analizi yapılarak, sosyal buradalık açısından ortamın özelliği ortaya konulmaya çalışılmıştır.

Araştırmanın Amacı: Bu çalışmanın amacı çevrimiçi bir topluluk olan Webheads grubunun düzenli olarak her hafta bir araya gelip gerçekleştirdikleri eş zamanlı ve metne dayalı sohbet kayıtlarının sosyal buradalık açısından söylem analizini yapmaktır. Çalışma sonunda elde edilen bulgular, çevrimiçi toplulukların eş zamanlı ve metne dayalı sohbet ortamlarındaki sohbet ortamlarının söylem açısından özelliklerini ortaya çıkarmaya yarayacaktır.

Araştırmanın Yöntemi : Bu çalışma etnografik bir çalışma olup verilerin analizi yöntemi olarak da söylem analizi kullanılmıştır. Çalışma etnografik bir çalışmadır; çünkü veriler bir amaç için toplanmamıştır ve çalışmanın verileri haftalık tartışma oturumları düzenleyen Webheads grubunun sohbet kayıtlarından oluşmaktadır. Webheads grubu 1998 yılında kurulmuş olan, amaçları dil öğretimi ile ilgilenen araştırmacı, öğretmen veya eğitmenlerin bir araya gelip deneyimlerini, görüşlerini ve materyallerini paylaşması olan bir gruptur. Bu grubun üyeleri 2001 yılından bu yana her Pazar günü 1 (GMT) ve 3 (GMT) saatleri arasında Tapped In diye bilinen bir ortamda bir araya gelerek tartışma oturumları düzenlemektedirler.

Tapped In ortamı ise her alandan eğitimcilerin bir araya geldiği, kendi ofislerini yarattıkları, öğrencileri ile çevrimiçi ders yürütmenin yanı sıra dünyanın herhangi bir yerinde meslektaşları ile biraraya geldikleri ve deneyimlerini paylaştıkları sanal bir ortamdır. Bu ortamda eş zamanlı olan ve eş zamanlı olmayan birçok iletişim aracı bulunmaktadır. Bu çalışmanın verileri Tapped In ortamının eş zamanlı araçlarından olan sohbet

bölümünden elde edilmiştir. Tapped In'in önemli bir özelliği de yapılan sohbetlerin anında kaydedilmesi ve kullanıcılara elektronik posta yoluyla ulaştırılmasıdır.

Bu çalışmanın üç araştırma sorusu bulunmaktadır. Bunlar (a) çevrimiçi bir topluluk olan Webheads grubunun eş zamanlı sohbetlerinde hangi tarzda sosyal buradalık kategorileri görüldüğü, (b) sosyal buradalık açısından en çok hangi kategorilerin görüldüğü ve yine (c) sosyal buradalık açısından en az hangi kategorilerin görüldüğüdür. Bu araştırma soruların cevaplamak için öncelikle sosyal buradalık açısından söylem analizi yapmak için halihazırda kullanılmakta olan bir ölçek belirlenmiştir. Daha sonra otomatik olarak kaydedilen sohbetlerin kayıtları bir araya getirilmiş ve Hyper Research yazılıma aktarılmıştır. Daha sonra belirlenen kodlar alınarak bunların ne kadar sıklıkla verilerde görüldüğü belirlenmiş ve verilerde sosyal buradalığa dair olan ancak ölçekte yer almayan kodlar listelenmiştir. Bu şekilde hazırda olan kodların ne kadar sıklıkla görüldüğü ortaya çıkmış, aynı zamanda da ölçekte bulunmayan kategoriler belirlenmiştir. Verilerin analizi için son olarak da yapılan analiz sonuçları tabloya çevrilmiştir.

Araştırma sonunda ölçekte var olmayan ancak sosyal buradalıkla ilgili olduğu düşünülen 5 kategori daha bulunmuştur ve toplamda 17 farklı kategoride veri analiz edilmiştir. Ölçekte bulunan kategoriler, "isim ile hitap etme", "duyguların ifade edilmesi", "soru sorma", "selamlama", "iltifat etme", "şaka yapma", "kendinden bahsetme", "aynı fikirde olduğunu ifade etme", "gruptan 'biz' diye bahsetme", "mesaja devam etme", "diğer mesajlardan alıntı yapma" ve "diğerlerinin mesajlarına gönderme yapma" şeklindeydi. Bu çalışma ile eklenen kategoriler ise "bağlantı paylaşma", "teşekkür etme", "ayrılma", "ayrılmaya hazırlanma" ve "ayrılmaya gelen karşılık" şeklindedir. Kullanılan ölçekte "selamlama" yer aldığı halde ortamdan ayrılmak için kullanılan ifadelere yer verilmemişti. Bu çalışmada bu eklendi. Ayrıca sosyal buradalığa doğrudan katkısı olan teşekkür etme ifadesi de yer almıyordu. Bunun yanı sıra bu ölçekte bilgi paylaşma amacıyla ile gönderilen bağlantı adresleri de dahil edilmemişti. Bu kategorilerin eklenmesi ile ölçeğe katkıda bulunulmuştur.

Araştırmanın Bulguları : En çok kullanılan kategoriler konusunda ise "isim ile hitap etme" en fazla görülen kategori olarak belirlenmiştir. Bunun en nedeni metne dayalı ortamlarda iki kişiden fazla katılımcının olduğu durumlarda kimin kime ne söylediğini anlamak için kullanıcılar genellikle hitap ettikleri kişilerin isimlerini kullanmaktadırlar. Bu da internet üzerinde eş zamanlı bir ortamda karışıklığı önlemektedir. En az kullanılan kategoriye baktığımızda ise "diğerlerinin mesajlarına gönderme yapma" kategorisi belirlenmiştir. Bunun nedeni de eş zamanlı sohbet esnasında geriye dönüp gönderme yapma gereği duyulmaması, diğer kullanıcıların rahatlıkla eski mesajlara ulaşabilmesidir.

Araştırmanın Önerileri : Çalışma sonunda elde edilen bulgular, daha once var olan bir ölçeğe yeni kategoriler kattığı için ve alanda bu konu ile ilgili çalışmaların sayısının azlığı açısından önemlidir. Sosyal buradalık konusunda söylem analizi yapmak isteyen araştırmacılara yardımcı olabilecek sonuçlar elde edilmiştir. Eğitimciler ve öğrenciler için ise metne dayalı eş zamanlı iletişimin olduğu bir ortamda gerçekleşen iletişimin özelliklerini ortaya koyması açısından ve onlara yol gösterici bir niteliği olması açısından önemlidir.

Anahtar Sözcükler: Sosyal Buradalık, Söylem Analizi, Bilgisayar Aracılığıyla İletişim, Metne Dayalı Eş Zamanlı İletişim.

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Psychiatric Symptomatology as a Predictor of Cyberbullying among University Students

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Abstract

Problem Statement: The internet as online technology has become one of the most popular communication channels among university students worldwide. Young adults and university students have become sophisticated users of technology and often lead the way in adapting new technologies for everyday use. Sometimes their technological savvy can become a gateway, exposing them to a host of sordid activities, including pornography, drugs, violence, and cyberbullying. Although online technologies provide numerous benefits (i.e., learning and teaching activities), online technology also has a potentially 'dark side,' as it can be used for harm. The current study focuses on the harmful consequences of one type of misuse of online technology: cyberbullying.

Purpose of Study: The purpose of the present study was to investigate the relations between cyberbullying and psychiatric symptoms, and to investigate which symptoms predicted cyberbullying.

Methods: This study was cross-sectional and correlational research. A demographic information form, questions about cyberbullying, and a Symptom Check List-90-Revised Form were administered to 695 undergraduate university students (247 males and 448 females).

Findings and Results: Data revealed that there are significant differences between "non-bully-victims," "pure-victims," "pure-bullies," and "bully-victims," according to the self-reported psychiatric symptom scores. The non-bully-victim group reported significantly less psychiatric symptoms than pure-victims and bully-victims. The path analysis revealed that hostility and psychoticism significantly predicted cyberbullying. Additionally, current cyberbullying could predict the possibility of future cyberbullying. Nearly half of the participants in the current study reported that they pretended (at least one time) to be someone else on the internet or cell phone. Additionally, a significant relation between cyberbullying and anonymity was found. Interestingly, although no gender differences were found in relation to victimization, males engaged in cyberbullying and pretended to be someone else in cyberspace significantly more frequently than females. Additionally, males were more likely than females to endorse that they would engage in cyberbullying in the future.

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Conclusions and Recommendations: The current study reported that some psychiatric symptoms were significant predictors of cyberbullying. The relation of psychoticism and hostility to cyberbullying particularly should be investigated in more detail in future research.
***Keywords*:** Cyberbullying, cybervictimization, psychiatric symptoms, university students.

The internet as online technology has become one of the most popular communication channels among university students worldwide (Hong, Li, Mao, & Stanton, 2007). Young adults and university students have become sophisticated users of technology and often lead the way in adapting new technologies for everyday use. Sometimes their technological savvy can become a gateway, exposing them to a host of sordid activities including pornography, drugs, violence, and cyberbullying (Agatston, Kowalski, & Limber, 2007). Although online technologies provide numerous benefits (i.e., learning and teaching activities), online technology also has a potentially 'dark side,' as it can be used for harm (Campbell, 2005). The current study focuses on the harmful consequences of one type of misuse of online technology: cyberbullying.

The consequences of cyberbullying are serious and far reaching, affecting both individuals and the larger social milieu (Finn & Banach, 2000). Teich and colleagues identified several forms of online abuse, including impersonation and fraud. They also noted that cyberbullying can occur when individuals send harmful spam, hate mail, and when they engage in criminal activities (e.g., stealing another's identity) (Cited in Beran & Li, 2005). The widespread consequences of cyberbullying have only recently attracted the attention of researchers and mental health experts. Although cyberbullying is a method of harassment by means of virtual reality, its effects are anything but virtual; they are real and have potentially serious negative consequences (Arıcak, 2007).

What is Cyberbullying?

Three noteworthy operational definitions of cyberbullying have emerged in the recent literature. According to Belsey (2008, p.1), "Cyberbullying is the use of information and communication technologies to support deliberate, repeated, and hostile behavior by an individual or group that is intended to harm others." Willard (2007, p.1) operationalizes the term as, "a way of being cruel to others by sending or posting harmful material or engaging in other forms of social aggression using the internet or other digital technologies." Finally, according to Strom and Strom (2005, p.21), cyberbullying is defined simply as "an electronic form of peer harassment."

The Mental Health Repercussions of Cyberbullying

Due to the extensive implications and negative consequences that cyberbullying behaviors generally have on victims, cyberbullying should be considered a widespread mental and public health issue (David-Ferdon & Hertz, 2007). Indeed, recent research suggests that cyberbullying is related to behavioral and psychosocial problems including anger, aggression, and rule-breaking behaviors (Patchin & Hinduja, 2006; Ybarra, Espelage, & Mitchell, 2007; Ybarra & Mitchell, 2007).

According to Ybarra (2004, p.247), "internet harassment is an important public mental health issue affecting youth today." Ybarra's research has found that young, regular internet users, who report DSM IV-like depressive symptomatology, are significantly more likely to concurrently report being targets of internet harassment (Ybarra, 2004). Similarly, Harman, Hansen, Cochran, and Lindsey (2005) reported that children who misrepresent themselves on the internet had less well-developed social skills, lower levels of self-esteem, and higher levels of social anxiety and aggression.

According to McKenna and Bargh (2000), the ability to anonymously interact on the internet contributes to the user's lower self-awareness. Anonymity may also stimulate bullies to react impulsively and aggressively toward other individuals online.

There are numerous researchers emphasizing the relationship between traditional bullying and mental health problems, including depression, anger, hostility, psychosis and so on (Campbell & Morrison, 2007; Gibb & Alloy, 2006; Houbre, Tarquinio, Thuillier, & Hergott, 2006; Lataster et al., 2006; Klomek, Marrocco, Kleinman, Schonfeld, & Gould, 2007; Seigne, Coyne, Randall, & Parker, 2007). As described previously, although some researchers study cyberbullying and the resulting behavioral problems, the growing problem of cyberbullying is an epidemic that has not as yet received the attention it deserves and remains virtually absent from the research literature (Campbell, 2005). The current study is a first step in contributing to this burgeoning and important area of research.

It is clear that there exists a global problem with cyberbullying. As a result of growing numbers of incidents reported in the United States, Canada, Japan, Scandinavia, Turkey and the United Kingdom, Australia and New Zealand, research in this area is imperative for informing effective prevention and intervention programs (Arıcak, Siyahhan, Uzunhasanoğlu et al., 2008; Campbell, 2005; Erdur-Baker & Kavsut, 2007; Li, 2006; 2007; National Children's Home, 2008).

Specifically, the purpose of the present study was to investigate the relations between cyberbullying and psychiatric symptoms, and to investigate which symptoms predicted cyberbullying. The extant literature is replete with studies that cite the occurrence of cyberbullying (Anderson & Sturm, 2007; Beran & Li, 2005; Campbell, 2005; Li, 2005; 2006; 2007; Strom & Strom, 2005). The focus of the current study was to extend this extant research and examine the interaction between cyberbullying and psychiatric symptoms.

Method

Participants

Participants were 695 undergraduate university students (247 males and 448 females) from 15 different programs in the Faculty of Education at Selçuk University, Turkey. Students' ages ranged from 18 to 22 years (M = 19.34, SD = 1.19). One hundred and ninety-nine students were freshmen, 232 were sophomores, 129 were juniors, and 135 were seniors. Low, middle, and high socioeconomic status was represented by 2.3%, 96.1%, and 1.6% of the participants, respectively. A convenience

sampling method was used to recruit participants. All participants indicated they were regular computer and internet users.

Procedure

Surveys were administered after class hours in classrooms from October to December 2007. A faculty member in the Faculty of Education at Selçuk University (who has a PhD in counseling) administered the surveys and answered participants' questions about the study. Prior to completing the surveys, participants were informed about the study and voluntarily signed a consent form to participate. The survey required approximately 30 minutes to complete. All data were coded and entered in an SPSS file by the same faculty member.

Instruments

The survey consisted of three sections. The first section consisted of five demographic questions regarding sex, age, department, class year, and socioeconomic level. The second section consisted of five questions specifically about cyberbullying. Finally, the third section included items from the Symptom Check List-90-Revised (SCL-90-R; Derogatis, Lipman, & Covi, 1973).

Questions about Cyberbullying. After the first section of the survey, participants were provided with an operational definition of cyberbullying. Belsey's (2008) definition was given. Additionally, a set of examples of cyberbullying were provided. Agatston et al. (2007) used a similar method in their study. Following the definition and examples, the following questions were provided and participants rated their subjective answers on a varying scale: Based on the definition of cyberbullying provided above (1) "Have you ever engaged in cyberbullying before today?" (1-Never, 2-One time, 3-Between two-four times, 4-Five or more times). (2) "Have you ever been exposed to cyberbullying?" (1-Never, 2-One time, 3-Between two-four times, 4-Five or more times). (3) "Would you engage in cyberbullying as a bully in the future?" (1-Yes, 2-I am not sure, 3-No). (4) "Have you ever pretended to be someone else on the internet or cell phone?" (1-Never, 2-One time, 3-Between two-four times, 4-Five or more times). (5) "Would you pretend to be someone else on the internet or cell phone in future?" (1-Yes, 2-I am not sure, 3-No).

Because the items require ordinal response categories, only content validity was examined and reported in this study. Two expert reviewers with PhDs knowledgeable about cyberbullying examined the items for ambiguity and the overall quality of the instrument. The language of the instruments was Turkish.

The Symptom Check List-90-Revised (SCL-90-R). The Symptom Checklist 90 (SCL90) is a 90-item self-report symptom inventory, developed by Derogatis et al. (1973) that was designed primarily to reflect the psychological symptom patterns of psychiatric and medical patients. It was originally developed for use in the USA. Validity and reliability analyses have been reported in several large-scale investigations (Derogatis & Cleary, 1977ab; Derogatis, Rickels, & Rock, 1976). The revised version of the SCL90 is scored and interpreted in terms of the following nine primary symptom dimensions: (1) Somatization (SOM), (2) Obsessive-Compulsive

(O-C), (3) Interpersonal Sensitivity (INT), (4) Depression (DEP), (5) Anxiety (ANX), (6) Hostility (HOS), (7) Phobic Anxiety (PHOB), (8) Paranoid Ideation (PAR) and (9) Psychoticism (PSY). An overall distress index can also be formed based on all 90 items: the Global Severity Index (GSI) (Bonicatto, Dew, Soria, & Seghezzo, 1997). All 90 items were administered in the current survey.

Items were printed on two sides of a single sheet. Instructions, which were also printed on the sheet, require the examinee to indicate on a Likert scale of 0-4 (i.e., not at all, a little bit, moderately, quite a bit, and extremely), the degree to which each item has caused discomfort. Higher scores indicate greater severity (Derogatis, 1975).

SCL-90-R was translated and adapted to Turkish by Dağ (1991) and Kılıç (1991). The test-retest reliability coefficients ranged between .75 and .87 for the subscales, and Cronbach alpha coefficients ranged between .64 and .85 for the subscales. A Cronbach alpha coefficient for the overall scale was .96 (Türkbay, Erman, Cöngöloğlu, & Söhmen, 2003).

Data Analyses

Descriptive and inferential statistics were used to examine the relations and interaction between cyberbullying and self-reported psychiatric symptoms. The statistical packages SPSS 15 for Windows (2006) and AMOS 7.0 (Arbuckle, 2006) were used to analyze the data. Frequencies, percentages, mean, standard deviation, chi-square, and Pearson Correlation coefficients were used for descriptive statistics. The Mann-Whitney U test was performed to examine sex differences in reported cyberbullying. GLM (General Linear Model) MANOVA was used to test the interaction and differences between sex and cyberbullying affiliation according to psychiatric symptoms. The path analysis in terms of structural equation modeling was performed to examine the predictive power of psychiatric symptoms on cyberbullying.

Findings and Results

Descriptive Statistics

In the overall sample (N= 695), 19.7% of students in the sample reported engaging in cyberbullying at least one time, and 54.4% of the students reported being victims of cyberbullying at least once in their lifetime. Of the 19.7% of respondents who reported engaging in cyberbullying at least one time, 2% (n = 14) were identified by the authors as a "pure-bully"; that is, someone who is a perpetrator of cyberbullying but has never been bullied. The other 17.7% of the 19.7% (n = 123) were labeled as "bully-victims" and reported being both perpetrators and victims of cyberbullying. In the sample, 36.7% of the students (n = 255) were labeled as "pure-victims" who never reported perpetrating cyberbullying but indicated they were bullied. Another 43.6% of students (n = 303) reported that they had never engaged in or been exposed to cyberbullying (i.e., "non-bully-victims").

Another 45.5% of the sample (n = 316) reported that they had at one time or another pretended to be someone else on the internet or cell phone. Analyses revealed a significant relation between cyberbullying and pretending to be someone else on the internet (χ^2 (3) = 51.55, p = .000). That is, 64.3% of the pure-bullies reported that they perpetrated by acting as if they were someone else. Similarly, 72.4% of the bully-victims cyberbullied others by pretending to be someone else.

When participants were asked if they would engage in cyberbullying in the future, 1.2% answered "yes," 15.8% answered "I am not sure," and 83% answered "no."When asked if they would pretend to be someone else on the internet or cell phone in future, the respondents reported "yes" (7.6%), "I am not sure" (29.6%) and "no" (62.7%).

Table 1 provides an analysis of the psychiatric symptoms reported by the respondents and reveals that the mean of the Global Severity Index (GSI) for the group was 1.16. The mean of the Obsessive-Compulsive scores was 1.55 at the highest point, and the mean of Phobic Anxiety was at a low of 0.76, representing the lowest mean score. Table 1 lists the means and standard deviations of the psychiatric symptoms reported by males and females.

Table 1

Mean and Standard Deviations for SCL-90-R

SCL-90-R Subscales	*Male (n = 247)*	*Female (n = 448)*	*General(N = 695)*
	M(SD)	*M(SD)*	*M(SD)*
Somatization (SOM)	0.91(.65)	1.12(.74)	1.04(.72)
Obsessive-Compulsive (O-C)	1.42(.73)	1.61(.73)	1.55(.74)
Interpersonal Sensitivity (INT)	1.25(.77)	1.46(.81)	1.39(.80)
Depression (DEP)	1.10(.72)	1.41(.81)	1.30(.79)
Anxiety (ANX)	0.90(.64)	1.12(.75)	1.04(.72)
Hostility (HOS)	0.98(.77)	1.00(.81)	0.99(.79)
Phobic Anxiety (PHOB)	0.61(.60)	0.85(.70)	0.76(.67)
Paranoid Ideation (PAR)	1.17(.74)	1.36(.80)	1.29(.78)
Psychoticism (PSY)	0.85(.66)	0.93(.71)	0.90(.69)
Global Severity Index (GSI)	1.04(.59)	1.23(.65)	1.16(.64)

Significant correlations emerged among all of the SCL-90-R subscales ($p < .001$). Correlation coefficients range between .56 and .90. All subscales were highly correlated with the GSI. Correlation coefficients among the subscales are reported in Table 2.

Table 2

Correlations between Subscales of SCL-90-R

	SOM	O-C	INT	DEP	ANX	HOS	PHOB	PAR	PSY	GSI
SOM	1.00	.65*	.56*	.66*	.72*	.57*	.58*	.58*	.63*	.80*
O-C		1.00	.73*	.77*	.70*	.56*	.64*	.69*	.71*	.85*
INT			1.00	.81*	.72*	.63*	.70*	.73*	.74*	.86*
DEP				1.00	.80*	.65*	.69*	.73*	.75*	.90*
ANX					1.00	.70*	.75*	.70*	.77*	.89*
HOS						1.00	.56*	.66*	.65*	.76*
PHOB							1.00	.64*	.66*	.79*
PAR								1.00	.74*	.83*
PSY									1.00	.87*
GSI										1.00

* P< .001

Inferential Statistics

The data were examined for normality and multicollinearity using AMOS 7.0 (Arbuckle, 2006). There were no missing data. Skewness and kurtosis values, and also the observations farthest from the centroid (Mahalanobis distance) showed that multivariate distributions were normal, and there were no significant outliers. Correlations between the variables ($r < .90$) showed that there was no multicollinearity (Tabachnick & Fidell, 2007).

Sex Differences in Cyberbullying

The Mann-Whitney U test was performed to examine sex differences in reported cyberbullying. This statistic was selected because the data are ordinal (1-Never, 2-one time, 3-between two-four times, 4-five or more times/1-Yes, 2-I am not sure, 3-No).

Results revealed significant differences between males and females with regard to cyberbullying and pretending to be someone else on the internet and cell phone. Males (M = 1.53, SD = .96) engaged in cyberbullying significantly more frequently than females (M = 1.28, SD = .73), (Mann-Whitney U = 48405.50, Z = -3.94, p = .000). Males (M = 1.87, SD = 1.00) were more likely than females to pretend to be someone else on the internet (M = 1.67, SD = .93), (Mann-Whitney U = 49411.50, Z = -2.58, p = .010). No significant difference between males and females with regard to being victims of cyberbullying were identified (Mann-Whitney U = 53257.00, Z = -.87, p = .385).

An examination of participants' attitudes about the likelihood that they will engage in cyberbullying in the future revealed that males (M = 2.72, SD = .50) are more likely than females to report that they will possibly perpetrate as cyberbullies

again in the future (M = 2.88, SD = .34),* (Mann-Whitney U = 47563.00, Z = -4.71, p = .000). Similarly, males (M = 2.48, SD = .66) were more likely than females (M = 2.59, SD = .61), * (Mann-Whitney U = 50631.00, Z = -2.18, p = .030) to pretend to be someone else and be a cyberbully in the future.

Psychiatric Symptom Differences between Non-Bully-Victim, Bully, Victim, and Bully-Victim Group (Cyberbullying Affiliation)

GLM (General Linear Model) MANOVA results show that there are significant differences between "non-bully-victims," "pure-victims," "pure-bullies," and "bully-victims," according to the self-reported psychiatric symptom scores (Λ = .91, F = 2.26, *Hypothesis df* = 30, η^2 = .032, p = .000). There was no significant interaction between sex and cyberbullying affiliation on psychiatric symptoms (Λ = .95, F = 1.26, *Hypothesis df* = 30, η^2 = .018, p = .159). A Bonferroni multiple comparison test was performed to explore specific differences between groups.

GLM MANOVA and Bonferroni tests show that non-bully-victims (M = .90, SD = .65) self-report significantly less somatization than pure-victims (M = 1.16, SD = .75) and bully-victims (M = 1.13, SD = .72), (F (3, 691) = 7.64, p = .000). Non-bully-victims (M = 1.45, SD = .72) self-report significantly less obsessive-compulsive symptoms than pure-victims (M = 1.62, SD = .74), (F (3, 691) = 3.15, p = .024). Non-bully-victims (M = 1.20, SD = .77) showed significantly less depression symptoms than pure-victims (M = 1.39, SD = .80), (F (3, 691) = 2.92, p = .033). Non-bully-victims (M = .93, SD = .70) self-reported significantly less anxiety than both pure-victims (M = 1.12, SD = .71) and bully-victims (M = 1.14, SD = .71), (F (3, 691) = 4.38, p = .005). Non-bully-victims (M = .90, SD = .79) self-reported significantly less hostility than bully-victims (M = 1.21, SD = .82), (F (3, 691) = 5.17, p = .002). Non-bully-victims (M = .67, SD = .64) reported significantly less phobic anxiety than pure-victims (M = .84, SD = .70), (F (3, 691) = 4.20, p = .006).

Non-bully-victims (M = 1.16, SD = .74) reported significantly less paranoid ideation than both pure-victims (M = 1.37, SD = .78) and bully-victims (M = 1.42, SD = .84), (F (3, 691) = 4.77, p = .003). Non-bully-victims (M = .83, SD = .66) self-reported significantly less psychotic symptoms than bully-victims (M = 1.04, SD = .77), (F (3, 691) = 3.55, p = .014). Finally, no significant differences between groups for interpersonal sensitivity (F (3, 691) = .79, p = .497) were found.

Structural Equation Modeling: Psychiatric Symptoms as Predictors of Cyberbullying

To examine the predictive power of psychiatric symptoms on cyberbullying, a path analysis using structural equation modeling was performed using AMOS 7.0 (Arbuckle, 2006). Path analysis is a method used to evaluate a theoretical model with direct and possibly indirect effects between exogenous and endogenous variables. Although path analysis and multiple regression analysis are similar methods, path

* The mean for females is higher than the mean for males because the answers were reverse coded. The item was coded as Yes =1, I am not sure = 2, and No = 3. Thus, the lower mean indicates a higher possibility.

analysis provides a better framework than multiple regression for specifying a particular theoretical model regarding the relationship among a set of exogenous and endogenous variables (Kline, 2005; Loehlin, 2004).

As seen in the Figure 1, all psychiatric symptoms on the SCL-90-R were considered exogenous (predictor/independent) variables, and engaging in cyberbullying (CB), exposure to cyberbullying and the possibility of engaging in cyberbullying in future (future CB) were entered as endogenous (outcome/dependent) variables. All variables were observed variables. Single-headed arrows in the path diagram illustrate the direction of the effect of one variable on another; the number associated with each of the single-headed arrows is the path coefficient. The curved two-headed arrows connecting two variables are correlation coefficients between independent variables. Circles represent errors in the prediction of the endogenous variables (Kline, 2005; Loehlin, 2004).

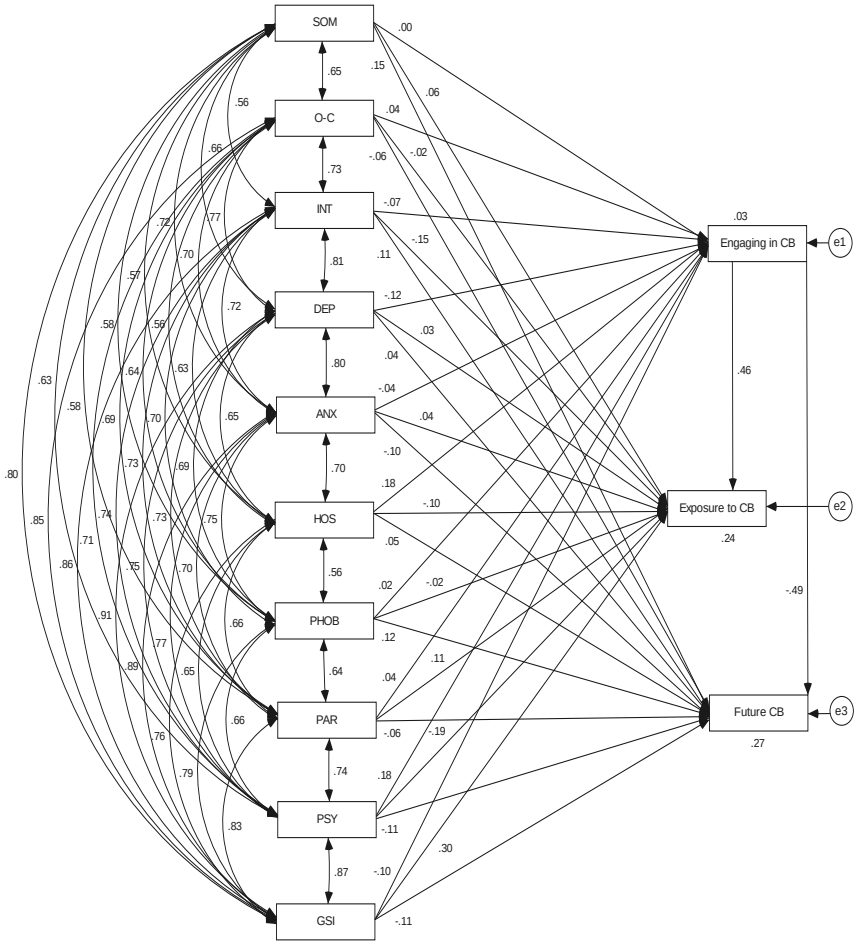

Figure 1. Path Analysis: Psychiatric Predictors of Cyberbullying

As Hu and Bentler (1999) and Tabachnick and Fidell (2007) suggested, chi-square, RMSEA, NFI, TLI, and CFI were selected to test the model's fit. The model fit indices all demonstrated an excellent fit, indicating that there was sufficient power in the sample size (χ^2 = .388, *df* = 1, *p* = .533; RMSEA = .000; NFI = 1.00; TLI = 1.00; CFI = 1.00). Maximum Likelihood method in a general linear model context was used in the analysis.

Psychiatric Symptoms Predicting Engaging in Cyberbullying

The path model revealed that hostility (HOS) and psychoticism (PSY) significantly predicted engaging in cyberbullying (β = .18, *p* = .006, and β = .18, *p* = .037, respectively). In other words, when hostility and psychoticism increased by one standard deviation, the likelihood that a participant would engage in cyberbullying correspondingly increased by .18 standard deviations (in terms of standardized regression weights). Likewise, when hostility increased by one point, engaging in cyberbullying increased .19 points, and when psychoticism increased by one point, engaging in cyberbullying increased .21 points (in terms of unstandardized regression weights).

Psychiatric Symptoms Predicting Exposure to Cyberbullying

Interpersonal Sensitivity (INT) and psychoticism (PSY) significantly predicted exposure to cyberbullying (β = -.15, *p* = .042, and β = -.19, *p* = .011, respectively). Further, when interpersonal sensitivity increased by one standard deviation, exposure to cyberbullying decreased by .15 standard deviations, and when psychoticism increased by one standard deviation, exposure to cyberbullying decreased by .19 standard deviations (in terms of standardized regression weights). Correspondingly, when interpersonal sensitivity increased by one point, exposure to cyberbullying decreased .21 points, and when psychoticism increased by one point, exposure to cyberbullying decreased .31 points (in terms of unstandardized regression weights).

Psychiatric Symptoms Predicting Possibility of Engaging in Cyberbullying in Future

Phobic anxiety (PHOB) and somatization (SOM) significantly predicted the likelihood of being a cyberbully in future (β = .12, *p* = .040, and β = .15, *p* = .032, respectively).* Further, when phobic anxiety increased by one standard deviation, the likelihood of being a cyberbully in the future decreased by .12 standard deviations, and when somatization increased by one standard deviation, the likelihood of being a cyberbully in future decreased by .15 standard deviations (in terms of standardized regression weights). Correspondingly, when phobic anxiety increased by one point, the likelihood of being a cyberbully in the future decreased .073 points, and when somatization increased by one point, the likelihood of being a cyberbully in the future decreased .088 points (in terms of unstandardized regression weights).

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* Although β has positive value, the direct effect is negative because the answers were reverse coded. The answers were coded as Yes = 1, I am not sure = 2, and No = 3. Therefore, the higher score reveals a lower possibility of engaging in the behavior (see Method/Instruments).

In addition to psychiatric symptoms, previous engagement in cyberbullying predicted the likelihood of being a cyberbully in the future (β = -.49, p = .000)** and being a cybervictim (β = .46, p = .000). In other words, as previous cyberbullying increased by one point, the likelihood of engaging in cyberbullying in the future increased .24 points, and cybervictimization increased .62 points (in terms of unstandardized regression weights).

Conclusions and Recommendations

Descriptive statistics demonstrate that there are more cybervictims than cyberbullies, a finding that is consistent with previous studies (ANCOMM, 2008; Kowalski & Limber, 2007; Li, 2006; Raskauskas & Stoltz, 2007). Nearly half of the participants in the current study reported that they pretended (at least one time) to be someone else on the internet or cell phone. Additionally, a significant relation between cyberbullying and anonymity was found. These findings underscore one of the fundamental problems inherent in cyberspace victimization; that is, that people can easily maintain anonymity while engaging in cyberbullying (Kowalski & Limber, 2007; McKenna & Bargh, 2000).

Interestingly, although no gender differences were found in relation to victimization, males engaged in cyberbullying and pretended to be someone else in cyberspace significantly more frequently than females. Additionally, males were more likely than females to endorse that they would engage in cyberbullying in the future. This is consistent with results reported by Li (2006), Ybarra and Mitchell (2007), and Kowalski and Limber (2007) who suggested that males engage in cyberbullying more frequently than females do. Agatston's et al. (2007) work may explain this phenomenon. They explain that while females consider cyberbullying problematic, males tend not to view cyberbullying as problematic.

Data from the current study indicate that there are significant differences between non-bully-victims, pure-victims, pure-bullies, and bully-victims in terms of their self-reported psychiatric symptoms. The non-bully-victim group reported significantly less psychiatric symptoms (on all dimensions of SCL-90-R) than pure-victims and bully-victims. Although pure-bullies' symptom scores were higher than non-bully-victims' scores, no significant difference emerged between groups because the number of pure-bullies in the sample was relatively small (n = 14). It is possible that the small group size increased the standard error in the MANOVA, and restrained the statistical difference (Tabachnick & Fidell, 2007). However, these findings are still consistent with findings of Ybarra (2004), Klomek et al. (2007).

The path analysis revealed the expected direct effect of psychiatric symptoms on cyberbullying. Hostility and psychoticism significantly predicted cyberbullying. This finding is noteworthy. A recent study by Campbell and Morrison (2007) indicated

** Although β has negative value, the direct effect is positive because of how the answers were coded. It was coded as Yes = 1, I am not sure = 2, No = 3. Therefore lower scores suggest higher possibility (see Method/Instruments).

that bullying is associated with a predisposition to experiencing psychotic symptomatology. Further, they suggested that experiencing psychotic-like symptoms increases the likelihood that a person's interpersonal environment is characterized by peer hostility and rejection (Campbell & Morrison, 2007). The current study provides support for a predictable relation between psychotic symptoms, hostility, and cyberbullying. Similarly, Camodeca and Goossens (2005) reported in their study that there is a strong relation between bullying and hostility. Correspondingly, according to the current path analysis, as psychoticism increases, exposure to cyberbullying decreases. Interpreted within the context of previous research, this means that if a person is a pure-bully, not a victim or bully-victim, the likelihood that he or she will also have psychotic-like experiences increases. According to Connolly and O'Moore (2003), pure-bullying is strongly related to psychoticism and neuroticism. However, a controversial-finding in the current study is that engaging in cyberbullying has a direct effect on one's exposure to cyberbullying. While at first glance it seems there is an inconsistency between these two findings, the findings are actually concordant when interpreted in light of the extant literature. In other words, this finding suggests that engaging in cyberbullying increases the likelihood of exposure to cyberbullying. This is quite possibly an explanation for the frequent finding in previous literature that has left unanswered the question as to why bully-victims exist in greater numbers in previous studies than pure-bullies or pure-victims (Arıcak et al., 2008; Li, 2006; 2007).

Path analysis also revealed that interpersonally sensitive people are exposed to cyberbullying less frequently compared to less interpersonally sensitive people. According to Rizzo, Daley, and Gunderson (2006), interpersonal sensitivity may be a factor affecting people's mood and as a result, people may be more interpersonally sensitive even in their cyberspace relationships and interactions. Although interpersonal sensitivity relates to neuroticism (Buhler, Haltenhof, Geyer & Bardeleben, 1999; Luty, Joyce, Mulder, Sullivan, & McKenzie, 2002), it also has a protective effect on being vulnerable in interpersonal relationships. People who are more sensitive may avoid dangerous or suspicious relationships in cyberspace.

Another interesting finding in the current study is that somatization and phobic anxiety are significant and *negative* predictors of possible future cyberbullying. That is, high self-reported somatization and phobic anxiety decrease the possibility of engaging in future cyberbullying (as perpetrator). The literature suggests that exposure to bullying (victimization) is causally related to somatization (Houbre et al., 2006; Strandmark & Hallberg, 2007; Swearer, Song, Cary, Eagle, & Mickelson, 2001; Ybarra & Mitchell, 2007), anxiety (Raskauskas & Stoltz, 2007; Rigby, Slee, & Martin, 2007) and school phobia (Kyriakides, Kaloyirou, & Lindsay, 2006; Thomas, 2006). However, before now, no study has been published on the direct effect of bullying or cyberbullying on phobic anxiety. This is the first study to report on this relation empirically and is important, because unlike other anxiety disorders, phobic anxiety occurs in specific situations. That is, a person who experiences phobic anxiety experiences an irrational fear and as a result avoids specific objects or situations (Lipsedge & Samuel, 2002). Previous studies on bullying have considered specific types of phobias such as school phobia or agoraphobia (Gladstone, Parker, & Malhi, 2006; Kyriakides et al., 2006; Thomas, 2006). Many researchers have proposed that

some hidden variable(s) in phobic anxiety, variables that cannot be investigated in the current study, influence the possibility of engaging in future cyberbullying. Future research should examine the effects of specific types of phobias.

Finally, the current study reports that some psychiatric symptoms are significant predictors of cyberbullying. The relation of psychoticism and hostility to cyberbullying particularly should be investigated in more detail in future research. Although the results of the path analysis revealed important findings, one limitation of the current study was that unequal participants by group (cyberbullying affiliation) did not allow for Multiple-Group Analysis in structural equation modeling. Future research ought to include studies that incorporate Multiple-Group Analysis to show differences among variables such as gender, socio-economic, and educational levels.

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Üniversite Öğrencilerindeki Siber Zorbalık Davranışlarının Bir Yordayıcısı Olarak Psikiyatrik Belirtiler (Özet)

Problem Durumu: İnternet ve online teknolojiler günümüz dünyasının en populer iletişim araçları olarak günlük yaşamın vazgeçilmezleri arasındaki yerini almıştır. Bu teknolojik araçlar özellikle gençler ve üniversite öğrencileri arasında daha da yaygın olarak kullanılmaktadır. İnternetin eğitim-öğretim başta olmak üzere pek çok alanda sağladığı yararlar

tartışılmazdır. Bununla birlikte her teknolojik gelişmede yaşandığı gibi görünen yararların yanı sıra teknolojinin kötüye kullanılmasından kaynaklanan sorunlar da ortaya çıkmaktadır. İnternet, cep telefonu, kısa mesaj servisi gibi iletişim araçları günlük yaşamı kolaylaştırmalarının yanında kötü niyetli kullanıcıların ellerinde diğer insanlara zarar veren araçlara dönüşmektedir. İsimsiz çağrılar, gizli kimlikle gönderilen yararsız (spam) e-postalar, hakaret ve tehdit içeren, bir kişi ya da grubu karalamak için e-posta ya da kısa mesajlar ile yayılan ses, görüntü ve metinler, virüslü e-postalar, tüm bu zararlı eylemlerin ortak bir isim altında tanımlanmasına neden olmuştur: Siber zorbalık.

Siber zorbalık, uluslararası literatürde genel olarak "diğer kişilere zarar vermek amacıyla, bir birey ya da grup tarafından, elektronik posta, cep telefonu, çağrı cihazı, kısa mesaj servisi ve web siteleri gibi bilgi ve iletişim teknolojilerinin kullanımını içeren; kasten, tekrarlayıcı bir şekilde ve düşmanca davranışları destekleyen davranışlar" şeklinde tanımlanmaktadır.

Siber zorbalık, son 10 yılda başta Amerika Birleşik Devletleri ve Kanada olmak üzere, internet ve online teknolojileri yoğun olarak kullanan ülkelerde başgöstermiş ve hızla yayılan ciddi bir sorun olarak karşımıza çıkmıştır. Özellikle gençler arasında daha fazla görülmesi ve sonuçlarının tahmin edilenden de yıkıcı olması, dikkatlerin kısa sürede bu sorun üzerinde odaklanmasına neden olmuştur. Bugün Amerika Birleşik Devletleri'nde siber zorbalık eylemleri okul başarısızlığından intihara dek uzanan pek çok sorunun nedenleri arasında sayılmaktadır. Son yıllarda Türkiye'de de hissedilen bu problem eğitim ve psikoloji alanında çalışan bazı uzmanların bu konuya eğilmesine neden olmuştur. Gerçekten de bu konuda gerçekleştirilen birkaç çalışma siber zorbalığın Türkiye'de de yaşanan bir sorun olduğunu göstermiştir.

Uluslararası literatür incelendiğinde, siber zorbalığın yaygınlığı, cinsiyete göre farklılıkları, görülme şekilleri ve geleneksel zorbalıkla ilişkisi başlıca araştırma problemleri olarak göze çarpmaktadır. Bu kadar önemli olmasına rağmen siber zorbalığı bir akıl sağlığı problemi olarak ele alan ve bu davranışları yordamaya çalışan araştırmalar oldukça azınlıktadır. Halbuki geleneksel zorbalıkla ilgili olarak çok sayıda yordamsal çalışmaya rastlamak mümkündür. Özellikle akıl sağlığı ile geleneksel zorbalık arasındaki ilişkileri gösteren çok sayıda araştırma bulunmaktadır.

İşte bu çalışma hem ülkemiz için yeni bir konu olan hem de uluslararası literatürde fazla değinilmeyen siber zorbalık ve psikiyatrik belirtiler ilişkisini ele almayı amaçlamıştır.

Araştırmanın Amacı: Bu çalışmanın amacı, siber zorbalık ve psikiyatrik belirtiler arasındaki ilişkiyi incelemektir. Psikiyatrik belirtilerin siber zorbalığı yordayıp yordamadığı, yorduyorsa hangi değişkenlerin anlamlı düzeyde yordama gücüne sahip olduğunun belirlenmesi amaçlanmıştır.

*Araştırmanın Yöntemi:*Bu çalışma kesitsel ve ilişkisel tarama türünde bir araştırmadır. Demografik bilgi formunun yanı sıra siber zorbalıkla ilgili sorular ve Belirti Tarama Listesi-90-R (SCL-90-R), 695 kişilik (247 erkek ve 448 kadın) bir üniversite öğrencisi grubuna uygulanmıştır. Veriler SPSS 15 ve AMOS 7.0 programlarında değerlendirilmiş, siber zorbalığı yordayan

psikiyatrik belirtilerin bulunmasında yapısal eşitlik modeli bağlamında yol analizi kullanılmıştır.

Araştırmanın Bulguları :Öğrencilerin %19.7'si hayatında en az bir kez siber zorbalık yaptığını, %54.4'ü ise en az bir kez siber kurban olduklarını belirtmişlerdir. Bu yüzdeler içinden hesaplanan saf-siber zorbaların oranı %2 iken, %36.7'si saf-siber kurban, %17.7'si ise siber zorba-kurban olarak tanımlanmıştır.

Araştırmaya katılan katılımcıların yaklaşık yarısı internet üzerinde ya da cep telefonu ile daha önceden (en az bir kez) bir başkasıymış gibi davrandıklarını ifade etmişlerdir. İnternet ya da cep telefonu üzerinde kimliğini gizleme davranışı ile siber zorbalık arasında da anlamlı bir ilişki olduğu bulunmuştur. Cinsiyete göre siber kurban olma durumu arasında anlamlı bir fark olmamasına karşın, erkeklerin kadınlara göre daha fazla siber zorbalık eylemlerine karıştıkları bulunmuştur. Aynı zamanda erkekler, gelecekteki olası siber zorbalık davranışlarında bulunmaya daha yatkın olarak belirlenmiştir.

Araştırmada göze çarpan en önemli bulgulardan ilki, siber zorba-kurban olmayan, saf-siber kurban, saf-siber zorba ve siber zorba-kurbanlar arasında psikiyatrik belirtiler açısından anlamlı bir farklılığa rastlanmış olmasıdır. Herhangi bir zorbalık yapmamış ve zorbalığa maruz kalmamış kişiler, saf-kurbanlardan ve zorba-kurbanlardan anlamlı düzeyde daha düşük psikiyatrik belirti göstermişlerdir. Diğer önemli bulgu ise düşmanca duygular ve psikotik belirtiler siber zorbalığı anlamlı olarak yordayan iki temel değişkendir. Aynı zamanda kişiler arası duyarlılık ve psikotik belirtiler siber zorbalığa uğrama yani siber zorba olma olasılığını da anlamlı düzeyde açıklamaktadır.

Bu bulgulara ek olarak daha önceden siber zorbalık yapmış olmak gelecekte de bu tür eylemlerde bulunma olasılığını artırmaktadır.

Araştırmanın Sonuçları ve Önerileri: Daha önceki pek çok araştırmada görüldüğü gibi bu çalışmada da ortaya çıkan sonuç, siber kurbanların sayısının siber zorbalara göre daha fazla olduğudur. Erkeklerin kadınlara göre daha fazla siber zorbalık eylemlerinde bulunmuş olması da diğer ülkelerde elde edilen bulgularla uyum göstermektedir.

Bu araştırmadan ortaya çıkan en önemli sonuç, düşmanca duygular ve psikotik belirtilerin siber zorbalığı yordayan iki temel değişken olmasıdır. Bu açıdan gelecekte yapılacak çalışmalarda bu iki değişkenin farklı desenlerde tekrar kullanılmak suretiyle derinlemesine analizlerin yapılması konuya netlik kazandıracaktır. Aynı zamanda cinsiyet, sosyoekonomik düzey ve eğitim düzeyi gibi farklı demografik özelliklere göre yapısal eşitlik modeli bağlamında çoklu grup analizlerinin de yapılması psikiyatrik belirtilerin farklı gruplara göre siber zorbalığı yordamada farklılaşıp farklılaşmadığını daha net ortaya koyacaktır.

***Anahtar Sözcükler*:** Siber zorbalık, siber kurban, psikiyatrik belirtiler, üniversite öğrencileri

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Gender and Computer Anxiety, Motivation, Self-Confidence, and Computer Use

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Abstract

Problem Statement: Gender-related differences toward the use of computers are well established. Males have traditionally dominated the use of computers and their applications in technological fields. Many researchers have attributed this gender gap in computer use to anxiety about using computers. Computer anxiety among females does not lessen with age or with experience using computers, and females have held a more negative attitude toward using computers than males. Thus females have been underrepresented in occupations that require using computers.

Purpose of the Study: This study explored the relationship between gender and (a) computer anxiety, (b) motivation, (c) self-confidence, and (d) the use of computers in a job or career. A random sample of 157 first-year students (77 females and 80 males) at Near East University in North Cyprus completed the Computer Attitude Scale.

Findings: A significant difference was found between females and males in computer self-confidence, females recording significantly lower scores than males. Male respondents recorded significantly higher scores of self-confidence on this scale than females did, although females and males expressed confidence in accomplishing work using computers. Mean scores for males were higher than female scores for computer anxiety, motivation, and use of computers, but group means did not differ significantly. Females and males disagreed or strongly disagreed about enjoying talking about computers, although females expressed significantly greater dissatisfaction toward discussing computers than males expressed.

Conclusions and Recommendations: Female students require greater motivation and self-confidence to use computers; otherwise, more males than females will continue to enroll in computer-related courses and programs, and more males than females will pursue careers in information technology. Future teachers, particularly female teachers, need encouragement to use computers and other technologies and develop

positive attitudes toward their use. The extent to which students use computers depends, in part, upon the comfort that teachers feel toward using computers in the classroom, the extent to which they integrate computers within courses and programs, and the extent to which students receive opportunities to use them.
Keywords: gender studies, pedagogical issues, secondary education, improving classroom teaching, teaching/learning strategies

Computers and computer-related technologies, because of their increasing importance in our lives, have become widespread in educational activities. (Melek & Claudia, 2008). Computers and related technologies have often been perceived as means for achieving a wide range of educational goals, including increasing student performance, enhancing student motivation for learning, and ensuring annual academic progress. Other potential benefits from using classroom computers include increasing student participation (Gross, Szekrenyes, & Tuduce, 2003), improving students' attitudes toward school (Tuzcuoğlu, 2000), teaching foreign languages, and creating a safe environment for students to experiment (Mikropoulos, 1994).

Gender-related differences toward the use of computers are well established. More than two decades ago, Raub (1981) identified gender as significantly related to computer anxiety, a factor that has influenced teachers' attitudes toward computers. Cooper and Weaver (2003) reported a "relatively high level of computer anxiety in the general population . . . [and] more girls and women suffer from computer anxiety than boys or men" (p. 13).

The use of computers and careers in technological fields have traditionally been dominated by males, a condition that Weaver (2006) and Cooper and Weaver (2003) labeled the *gender gap*. These researchers attributed this gender gap to anxiety, a topic investigated since the mid-1980s (Bunz, Curry, & Voon, 2007; Gressard & Loyd, 1986; Todman & Day, 2006; Weil, Rosen, & Sears, 1987; Zhang, 2005). Computer anxiety among females does not lessen with age (Cooper & Weaver, 2003; Weaver, 2006) or with experience using computers (Broos, 2005). According to Deniz and Ulas (2008), academic success and career options have been limited for people having computer anxiety. Fewer females than males enroll in computer classes, and females hold a more negative attitude toward computers than males (Wilder, Mackie, & Cooper, 1985). Thus females are underrepresented in occupations that require using computers (Panteli & Ransay, 2001). According to Weinman and Cain (1999), without closing the gender gap, adult females will remain in lower-paying jobs that lack opportunities for advancement because better paying jobs and more prestigious careers require the use of computers and computer-related technologies.

Using computers and related technologies has been associated with positive attitudes (Jay & Willis 1992; Sexton, King, Aldridge, & Goodstadt-Killoran, 1999) and motivation for learning. Anxiety influences attitudes toward computers (Chau, Chen, & Wong, 1999; Marcolides, 1998), as do teachers' attitudes toward computers in the classroom (Hannafin & Freeman, 1995). Pina and Harris (1993), Miura (1987), and Teo (2006) found that attitudes toward computers affected the extent to which

students used computers for learning. Harrington, McElroy, and Morrow (1990) found that high anxiety negatively affected learning computer skills, and Gugerty, Treadway, and Rubinstein (2006), Hannafin and Freeman (1995), and Pina and Harris (1993) noted that lack of self-confidence affected attitudes toward using computers. Females and males have differed in their familiarity with and use of computers. Because female teachers often lack the computer experience of males, they have been less likely to use computers and less likely to regard computers positively than male teachers (Chen, 1986). Levine and Donitsa-Schmidt (1997) found that self-confidence and a positive attitude toward computers resulted in a commitment to learn to use them.

Problem Statement

Rapid developments in technology have led to the ubiquitous use of computers and related technologies in almost every aspect of human life. Although educational researchers have explored the integration of computers and technologies in schools and how technology affects instruction, technological changes have not resulted in establishing a core curriculum for computer education, adopting standards for student proficiency in computer use, or creating environments within which females and males use computers equally (Anderson & Collis, 1993). Neither has the use of classroom computers and technology fulfilled the expectations of teachers and school officials for improving academic achievement, nor have they revolutionized education as predicted by many politicians and academicians (Cuban, 2001; Metiri Group, 2006). Although schools continue to spend millions of dollars to equip classrooms with computers and integrate their use with instruction, student performance has not markedly improved in any subject (National Center for Education Statistics, 2005), and gender differences remain. Proportionately more females are affected by computer axniety, and females are underrepresented in professions and occupations that require their use (Weaver, 2006).

Purpose

This study explored the relationship between gender and (a) computer anxiety, (b) motivation, (c) self-confidence, and (d) use of computers in a job or career. The null hypothesis tested was that there was no significant difference between gender and each of these four factors. Significance was set at the .05 level of confidence.

Methods

A random sample of 157 first-year students at Near East University in North Cyprus completed the Computer Attitude Scale (Loyd & Gressard, 1984), which Berberoğlu and Çalıkoğlu (1992) translated from English into Turkish. The survey was distributed to 77 females and 80 males during May 2007. Respondents were

assured that their participation would remain anonymous and that their responses would be reported only as aggregate data.

Respondents rated 40 items on a Likert scale (5 = Strongly Agree, 4 = Agree, 3 = Undecided, 2 = Disagree, and 1 = Strongly Disagree). The total score and four subscales scores were analyzed: (1) computer anxiety (items 1, 5, 9, 20, 25, 33, and 37); (2) motivation (items 3, 7, 8, 11, 12, 13, 15, 17, 23, 27, 31, 34, 35, 36, and 39); (3) self-confidence (items 2, 6, 10, 14, 18, 19, 22, 26, 29, 30, 32, and 38); and (4) use of computers in a job or career (items 4, 16, 21, 24, 28, and 40). Cronbach's alpha for the 40-item scale was .71. Reliability coefficients for the subscales were as follows: anxiety (.76), motivation (.70), self-confidence (.77), and use of computers (.67).

A *t* test of independent samples was used to compare female and male means for each item and the four subscale means. To avoid overdeclaring the number of significant differences and committing Type I errors because of multiple-mean comparisons, the criterion for significance was adjusted using Holm's sequential Bonferroni (Holm, 1979). This adjustment creates a slightly different level of significance for each calculated *t* test. A one-way ANOVA was used for comparing the four subscales scores. Significance was set at the .05 level of confidence.

Results

The age range of respondents was 17–25 years. The vast majority of students (n = 147, 92%) was aged 17–23 years. The gender of respondents and the educational preparation programs (preschool, primary, computer technology, and counseling) in which they were enrolled are presented in Table 1.

Table 1

Gender and Academic Department of Respondents

		Department			Total
Gender		Preschool	Primary	Counseling	Preschool
Female	Count	30	23	27	80
	% of Total	19.1%	14.6%	17.2%	51.0%
Male	Count	28	19	30	77
	% of Total	17.8%	12.1%	19.1%	49.0%
Total	Count	58	42	57	157
	% of Total	36.9%	26.8%	36.3%	100.0%

Means scores for survey items of female and male respondents are presented in Table 2. A *t* test for independent samples found significant differences (p = .01) between the responses recorded by females and males for items 14 and 39 (see Table 3).

Table 2

Computer Attitude Scale

Items		Female Means	Male Means	Mean Difference
1.	I do not use computers very well.	3.05	3.38	-0.33
2.	A computer does not scare me.	3.89	4.10	-0.22
3.	I like using a computer.	4.21	4.38	-0.16
4.	I will use a computer throughout my life.	3.56	3.31	0.25
5.	Working with a computer makes me nervous.	2.69	2.32	0.36
6.	I feel okay about trying to solve a problem using a computer.	3.19	3.57	-0.38
7.	The challenge of solving problems with computers does not appeal to me.	1.99	1.87	0.12
8.	Learning about computers is a waste of time.	1.86	1.91	-0.05
9.	I do not feel threatened when others talk about computers.	2.03	2.03	0.00
10.	I don't think I would do advanced computer work.	2.48	2.43	0.05
11.	I think working with computers would be enjoyable and stimulating.	3.59	3.84	-0.26
12.	Learning to use computers is worthwhile.	3.48	3.86	-0.38
13.	I feel aggressive and hostile toward computers.	2.81	2.30	0.51
14.	I am sure I could do work with computers.	3.48	4.23	-0.76
15.	Figuring out computer problems does not appeal to me.	3.41	3.84	-0.43
16.	I need a firm mastery of computers for my future work.	3.91	4.25	-0.33
17.	It would not bother me to take computer courses.	1.94	2.27	-0.34
18.	I am not the type who does well with computers.	1.59	1.97	-0.39
19.	When there is a problem with a computer that I cannot immediately solve, I would stick with it until I have the answer.	2.08	2.18	-0.11
20.	Computers make me feel uncomfortable.	1.74	2.05	-0.31
21.	I expect to have little use for computers in my daily life.	2.20	2.44	-0.24
22.	I am sure I could learn a computer language.	3.39	3.56	-0.17

23.	I do not understand how some persons spend so much time working with computers and seem to enjoy it.	1.91	2.49	-0.58
24.	I cannot think of any way that I will use computers in my career.	1.83	2.29	-0.46
25.	I would feel at ease in a computer class.	1.91	2.12	-0.20
26.	I think using a computer would be very hard for me.	1.83	2.12	-0.29
27.	After I start using the computer, I find it hard to stop.	2.93	3.26	-0.33
28.	Knowing how to work with computers will increase my job possibilities.	3.75	3.68	0.07
29.	I get a sinking feeling when I think of trying to use a computer.	2.31	2.39	-0.08
30.	I could get good grades in computer courses.	3.68	3.57	0.10
31.	I do as little work with computers as possible.	3.44	2.71	0.72
32.	Anything that a computer can be used for, I can do just as well some other way.	2.80	3.05	-0.25
33.	I would feel comfortable working with a computer.	3.00	3.55	-0.55
34.	I do not think I could handle a computer course.	1.99	2.45	-0.47
35.	If a problem is left unsolved in a computer class, I would continue to think about it afterward.	2.98	2.88	0.09
36.	It is important to me to do well in computer classes.	3.83	3.43	0.40
37.	Computers make me feel uneasy and confused.	2.53	2.62	-0.10
38.	I have a lot of self-confidence when it comes to working with computers.	3.20	3.32	-0.12
39.	I do not enjoy talking with others about computers.	1.84	2.57	-0.73
40.	Working with computers will not be important.	2.20	2.44	-0.24

Table 3

Survey Items That Differed Significantly Between Females and Males

		Levene's Test for Equality of Variances				
		F	Sig.	*t*	df	Sig. (2-tailed)
14. I am sure I could do work with computers.	Equal variances assumed	.16	.69	2.45	155	.016
39. I do not enjoy talking with others about computers.	Equal variances not assumed	17.28	.01	-3.65	138.82	.01

Females and males expressed confidence in accomplishing work using computers (item 14). Male respondents, however, recorded significantly higher scores of self-confidence on this measure than females. Females and males disagreed or strongly disagreed about enjoying talking with about computers (item 39), although female expressed significantly greater dissatisfaction about discussing computers than males reported.

Marked differences were found among seven survey items, although scores of females and males did not differ significantly after applying Holm's sequential Bonferroni. Four items on the motivation subscale (items 13, 15, 23, 34) differed markedly, females recording the higher score, except on item 13. Females expressed greater aggression and hostility toward computers than males (p = .016) but recorded greater disagreement regarding wanting to solve computer problems (p = .014). Females disagreed more about not understanding why some people use and enjoy computers (p = .003) and disagreed strongly about completing a computer class successfully (p = .03). Females disagreed more strongly than males that they would not do well using computers (item 18, p = .003) and expressed greater agreement about feeling comfortable about working with computers (item 33, p = .005). Females expressed greater disagreement than males with the idea that they would not use a computer in their career (item 24, p = .017).

Descriptive statistics for the four subscale scores are presented in Table 4. Regarding responses recorded on the subscales, a significant difference was found between females and males for computer self-confidence, females recording significantly lower scores than males (see Table 5). Mean scores for males were higher than female scores for computer anxiety, motivation, and use of computers, but group means did not differ significantly.

Table 4

Descriptive Statistics for Four Subscale Scores by Gender

Variables	Gender	*N*	Mean	SD	SE
Anxiety	Female	80	16.938	3.626	.405
	Male	77	18.064	4.452	.507
Motivation	Female	80	42.186	7.429	.831
	Male	77	44.078	6.749	.769
Self-Confidence	Female	80	33.888	4.728	.529
	Male	77	36.507	5.541	.631
Use of Computers	Female	80	17.1250	3.709	.415
	Male	77	18.156	3.685	.420

Table 5

One-Way ANOVA for Four Subscales

		Levene's Test for Equality of Variances				
Dependent Variables		*F*	Sig.	*t*	df	Sig. (2-tailed)
Anxiety	Equal variances assumed	4.35	.039	-1.74	155	.083
						.085
Motivation	Equal variances assumed	.68	.412	-1.67	155	.098
				-1.67	154.49	.097
Self-Confidence	Equal variances assumed	2.64	.106	-3.19	155	.002
Use of Computers	Equal variances assumed	.73	.394	-1.75	155	.083
				-1.75	154.84	.083

Conclusions

Computers will undoubtedly continue to play an increasing role in schools and in life. Tomorrow's world of work will increasingly require the use computers and related technologies. Future teachers and counselors need to develop a positive attitude toward computers to maximize their effectiveness in developing self-confidence and motivating students to learn computer skills, particularly female

students. This study, whose sample consisted of first-year students preparing for careers in education, found that females and males differed significantly on several measures of the Computer Attitude Scale. Motivation, but not computer anxiety, differed significantly between females and males.

Historically, more females than males have been affected by computer anxiety, a condition that likely results from the lack of interaction with computers. Cooper and Weaver (2003) found that adolescent females who did not complete computer courses in high school were at a disadvantage in college. They concluded that females must enter college with computer experience and comfortable feelings toward them; otherwise, they will remain disproportionately underrepresented in jobs and careers that use computers. Because of this reason, as Yıldırım (2008) mentioned, it is thought that helping both students and their families become more familiar with computers may reduce negative feelings toward using them. According to Chappel (1996), because computer programs have been designed more for males than for females, males become accustomed to using computers, often by playing games, and girls become increasing anxious about using computers. Cooper and Weaver concluded, "In a society that is becoming more and more reliant on the ability to use computers, this may have far-reaching consequences for professional employment and [job] satisfaction" (p. 25).

Recommendations

Female students require greater motivation and self-confidence to use computers; otherwise, more males than females will continue to enroll in computer-related courses and programs, and more males than females will pursue careers in information technology. Future teachers, particularly female teachers, need encouragement to use computers and other technologies and develop positive attitudes toward their use. The extent to which students use computers depends, in part, upon the comfort that teachers feel toward using computers in the classroom, the extent to which they integrate computers within courses and programs, and the extent to which students receive opportunities to use computers.

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Cinsiyetle, Bilgisayar Endişesi, Motivasyon ve Kendine Güven Arasındaki İlişki

Özet

Problem Durumu: Teknolojideki hızlı gelişim, bilgisayarların ve buna bağlı tüm teknolojik aletlerin hayatımızın her parçasında git gide daha fazla ve daha yaygın bir şekilde kullanılmasını sağladı. Her ne kadar eğitim araştırmacıları bilgisayar ve teknoloji imkanlarının okullarda daha etkin kullanılmasını araştırmış olsalar da, teknolojik gelişim bilgisayar eğitiminde ana bir sisteme veya öğrencilerin bilgisayar kullanımındaki etkinliğine veya erkek ve kadınların eşit bilgisayar kullanma haklarına bir faydası olmamıştır. Bunlara ek olarak, sınıflarda bilgisayar ve teknoloji kullanımı, öğretmenler ve okul yönetiminin beklediği başarıyı yakalayamadı ve coğu akademisyen ve politikacının umduğu gibi eğitimde çığır açmadı. Okulların milyonlarca dolar harcayıp sınıfları bilgisayarlar ile donatıp eğitim sistemine uylarlamalarına rağmen, öğrencilerin performansları gözle görülür bir şekilde artmış değilir. Ayrıca, cinsiyet farkılılıkları devam etmekte ve gözlendiği zaman daha fazla bayan bilgisayar endişesinden şikayetcidir ve bu yüzden bayanlar bilgisayar kullanımın gerekli olduğu iş sahalarında daha az temsil edilmektedirler.

Araştırmanın Amacı: Bu çalışmada cinsiyet ve (a) bilgisayar endişesi, (b) motivayson, (c) kendine güven ve (d) iş ortamı veya kariyerde bilgisayar kullanımını araştırıldı. Test aşamasında cinsiyet ve bu 4 faktör arasında hiçbir değişiklik olmadığı varsayılmıştır.

Araştırmanın Yöntemi: Kuzey Kıbrıs'taki Yakın Doğu Üniversitesi'nden rastgele seçilmiş 157 birinci sınıf öğrencisinin katıldığı bu Bilgisayara Karşı Tavır Ölçeği araştırmasını (Loyd & Gressard, 1984), Berberoğlu ve Çakıroğlu (1992) İngilizceden Türkçeye çevirmiştir. Araştırma Mayıs 2007'de 77 bayana ve 80 erkeğe dağıtılmıştır. Katılımcıların kimliklerinin açıklanmayacağı ve cevaplarının sadece ve sadece ölçek amaçlı kullanılacağı garantisi de verilmiştir.

Katılan öğrenciler 40 öğeyi Likert ölçeğine göre değerlendirmiştir (5 = Kesinlikle Katılıyorum, 4 = Katılıyorum, 3 = Kararsız, 2 = Katılmıyorum, 1 = Kesinlikle Katılmıyorum). Toplam sonuç ve 4 faktör analiz edilmiştir: (1) bilgisayar endişesi; (2) motivasyon; (3) kendine güven; (4) iş ortamı ve kariyerde bilgisayar kullanımı. Cronbach'ın skoru 0.71 idi. Bu 4 faktörün güvenirlik katsayısı ise; endişe (.76), motivasyon (.70), kendine güvenirlilik (.77), ve bilgisayar kullanımı (.67) şeklindedir.

Her öğe ve 4 faktörün bay ve bayan ortalamalarını karşılaştırmak amacı ile bağımsız bir *t* testi uygulanmıştır. Kategori 1 hatalarını ve önemli farklılıkların sayılarını tekrar tekrar yayımlamayı önlemek amacı ile Holm'un Benferroni (Holm, 1979) ardışığı ayarlanmıştır. Bu ayarlama, hesaplanan her *t* test için çok az bir fark ortaya çıkarmaktadır.

Bulgular ve Sonuçlar: Katılımcı öğrencilerin yaş grubu 17 ile 25 arasındaydı. Öğrencilerin büyük bir çoğunluğu 17 ile 23 yaş arasındaydı (n = 147, 92%). Katılımcı öğrencilerin cinsiyeti ve eğitim hazırlık programları, erkek ve bayan öğrenciler tarafından 14 ve 39′ uncu maddeye verilen cevaplarda önemli değişiklikler ortaya çıkarmıştır (p = .01). Hem bayanlar hem erkekler işlerini bilgisayar ile yaptıklarında öz güvenlerinin daha fazla olduğunu belirttiler. Aslında, erkek katılımcılar kendine güvenirlilik konularında bayan katılımcılara göre daha yüksek puanlar tutturmuşlardır. Bayanlar ve erkekler genelde bilgisayar hakkında konuşmanın eğlenceli olduğuna ya katılmadılar ya da kesinlikle katılmadılar, bayanlar erkeklere göre bu konuda daha fazla memnuniyetsizlik göstermişleridir.

Motivasyon ölçeğinde 4 maddede genelden farklı sonuçlara ulaşıldı. 3 maddede bayanlar daha yüksek puanlar elde etti. Bayanlar erkeklere göre bilgisayarlara karşı daha fazla saldırganlık göstermiştir, fakat bilgisayar problemlerini çözmek konusunda daha az istekli görünmüşlerdir. Bayanlar, bazı insanların bilgisayar kullanmaktan keyif aldıkarlarına katıldıklarını ve bir bilgisayar kursuna katılıp bitirmek konusuna kesinlikle karşı çıktıklarını belirttiler. Aynı zamanda bayanlar, bilgisayar kullanımında başarısız olacakları konusuna kesinlikle katılmadıklarını ve bilgisayar kullanırken çok rahat olduklarını belirttiler. Yine bayanlar, kariyerlerinde bilgisayar kullanıcısı olmayacaklarına kesinlikle katılmadıklarını belirttiler.

Bilgisayar öz güveni konusunda bayanlar ve erkekler arasında büyük bir fark olduğu tespit edilmiştir. Bilgisayar endişesi konusunda, motivasyon ve bilgisayar kullanımı konularında erkekler bayanlara göre daha yüksek bir ortalama elde etmişlerdir ama grup ortalamaları pek farklılık göstermemiştir. İleri yıllarda öğretim görevlileri, öğrencilere bilgisayar tekniklerini öğretmek ve öz güvenlerini artırmak için bilgisayarlara karşı olan düşüncelerini daha olumlu bir hale getirmelidirler. Öğretim fakültesindeki birinci sınıf öğrencileri arasında yapılan bu araştırma, bayanlar ve erkeklerin Bilgisayara Karşı Tavır Ölçeğinde büyük farklılıklar gösterdiğini ortaya koymuştur. Aslında, bilgisayar endişesi değil de motivasyon bayanlar ve erkekler arasında büyük farklılık göstermiştir.

Eğer bayanlar üniversiteye başladıklarında belli bir seviyede bilgisayar deneyimleri yoksa, bilgisayar kullanılan iş ortamlarında kendilerini ezik hissedeceklerdir. Bilgisayar programlarının genellikle erkeklere yönelik olmasından dolayı, örneğin oyunlar, erkekler bilgisayar kullanımında daha tecrübeli olurlar ve bayanların bilgisayar kullanırken hata yapma korkuları çoğalır.

Öneriler: Bayanların erkeklere göre bilgisayara kullanırken daha fazla motivasyona ve öz güvene ihtiyaçları vardır, aksi takdirde daha fazla erkek bilgisayar kursularına katılıp teknoloji ile ilgili iş bulacaklardır. Gelecekteki öğretim görevlileri, özellikle de bayanlar, bilgisayar kullanmaları hakkında

daha fazla teşviğe ihtiyaçları vardır. Öğrencilerin sınıflarda bilgisayar kullanması öğretmenlerin bilgisayarlar kullanımına karşı olan tutumuna, bilgisayarları ne kurslara ne kadar entegre ettiklerine ve öğrencilerin ne kadar çok bilgisayar kullanma şansları olduğuna bağlıdır.

Anahtar Sözcükler: Cinsiyet araştırmaları, pedagoji hakkında problemler, orta öğretim, sınıf eğitimini geliştirmek ve öğretme-öğrenme stratejileri.

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Perceived Problems of Computer Teachers

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Abstract

Problem Statement: Effectively equipping 21st-century individuals with skills to use Information and Communication Technologies (ICTs) is of utmost importance, as they have become commonplace in most areas of life. Such skills are established in the K-12 curriculum. In this regard, computer teachers in K-12 schools play the leading role both in the computer-literacy education of their students, and in assisting other teaching and administrative staff. However, a considerable amount of computer teachers have either received minimal or no formal education regarding their subject area, or they are not called for assistance in accordance with the education they have received. Thus, they are confronted with several instructional, administrative, technical, and personal problems while fulfilling their roles.

Purpose of the Study: This study investigates the problems that K-12 computer teachers experience, and examines whether their problems vary with regard to certain variables, particularly gender, educational background, and experience.

Methods: Seventy-two computer teachers working in the city of Eskisehir, Turkey were administered a 47-item Likert questionnaire which had high internal reliability coefficients along with an ideal response rate of 92 percent. Data were analyzed through descriptive statistics followed by relevant parametric tests, including t-tests and analysis of variance (ANOVA).

Results: Administrative problems were the most serious problems, while personal issues were not considered important by the participants. Teachers differed in terms of the amount of perceived technical problems with regard to gender, educational background, and experience. Female teachers reported to have more technical problems than male teachers. Education faculty graduates had significantly more technical problems, whereas technical education faculty graduates had significantly more instructional problems. Finally, teachers with two to four years of

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experience reported more technical problems than teachers with five and more years of experience.

Conclusions and Recommendations: Computer teachers are the front line individuals in equipping pupils with relevant ICT skills for the 21st century. However, it seems they are neither well-prepared for the work, nor well-supported in carrying out their duties. Thus, an important implication for policy-makers is to clarify the job definitions of computer teachers, particularly as they complain mostly about administrative problems. Lack of sufficient ICT education for other teachers increases the responsibilities of computer teachers and results in role conflicts and work overload. Thus, overcoming colleagues' inadequate understanding concerning the roles of computer teachers carries importance, as well as sustaining a balance between the curricula of education faculties and technical education faculties.

Keywords: Computer education, teacher education, teacher background, teacher experience, gender

Information and Communication Technologies (ICTs) are becoming commonplace in education, employment, and daily use, which makes it important that every adult and every child has the chance to develop the knowledge and skills needed to use ICTs effectively and independently. In regard to schools, as indicated in National Educational Technology Standards (ISTE, 2002), all students should be enabled to develop technology skills that support learning, productivity, decision making, and daily life. In many parts of the world, including Europe, Russia, Asia, South Africa, New Zealand, and Australia, ICT skills development are being integrated in the K-12 curriculum (Tucker, Deek, Jones, McCowan, Stephenson & Verno, 2003). Tucker et al. suggest that computer literacy programs for K-12 students should not only introduce the basics of computers at the elementary level, but enable students to learn using ICTs and have opportunities to study computers in depth and prepare for entry into the workforce through additional electives. From this it follows that K-12 teachers carry considerable responsibility to equip students with working knowledge of ICTs. However, the majority of teachers have received minimal or no formal education in this important area (Pontier, 2005). Ajwa (2007) maintains that the lack of formal computer education programs in teacher training institutions and the lack of in-service training opportunities for existing teachers cause such an anomaly.

This worldwide problem is shared in Turkey. Prior to the establishment of the Departments of Computer Education and Instructional Technology (CEIT) in 1998, and producing their first graduates in 2002, teachers at the various levels and in the various subject areas fields were simply provided with some short, in-service training, and then expected to integrate ICTs into the curriculum (Akkoyunlu, 2002). However, the increasing need for proficient computer teachers capable of integrating ICTs across the curriculum led Turkish policy-makers to establish undergraduate programs for computer teachers. The most comprehensive initiative in ICT-based education undertaken by the government was included within the Basic Education

Program (BEP), which was conceived by the Turkish Ministry of National Education (MoNE) to integrate ICTs into the curriculum from the fourth year of elementary school (Turkish Ministry of National Education [MoNE], 2007). The program, which cost US$300 million, was designed to improve the quality of Turkish primary education, add three years to compulsory schooling, train and recruit additional teachers, provide in-service training for school administrators, and provide technical infrastructure and support for ICT integration in schools (Turkish Ministry of National Education [MoNE], 2007; Ozdemir & Kilic, 2007).

Despite the considerable expenditure in pursuit of ICT integration in the classroom, a recent study has indicated that ICTs are still not being sufficiently integrated into classroom practice (Demiraslan & Usluel, 2005). Thus, the teachers assigned as computer teachers or computer coordinators in schools have a crucial role in further developing the ICT integration agenda. However, it has been found that computer teachers encounter some serious problems in trying to fulfill their roles. The school administrators expect them to encourage and support the integration of ICTs in the other teachers' lessons and provide technical support, but fail to give them the training, time, resources, status and authority to perform these duties. It is quite common to find that these computer teachers encounter a mix of pedagogical, administrative, technical, and personal problems. The following study was designed to investigate the perceived problems of computer teachers in K-12 schools and examine these problems with respect to certain variables (i.e. gender, educational background, and experience).

Roles and Perceived Problems of Computer Teachers

Computer teachers in K-12 schools have a potentially important role in helping with students' ICT skills development and assisting other teaching and administrative staff in their uses of ICTs. According to ISTE (2004), where National Council for Accreditation of Teacher Education (NCATE) Standards for Secondary Computer Science Education (CSED) were announced, computer teachers should be able to prepare their students in terms of problem analysis, algorithm selection and evaluation, program design, implementation, specification, and verification and systems analysis (Pontier, 2005). Black (2006) suggests that computer teachers also should be leaders, capable of motivating other staff to become promoters of computer integration in their classrooms. However, alongside these responsibilities, it is often the case that computer teachers must be responsible for maintaining the ICT laboratories in K-12 schools and even carrying out normal teaching duties (Newberry, 1992). In Turkey, additional tasks are assigned to computer teachers because of the lack of sufficient technical staff, lack of systematic training for classroom teachers, and lack of definition in computer teachers' responsibilities. Computer teachers in Turkish K-12 schools are expected to provide computer courses in line with the curriculum and course objectives, collaborate with other teachers in integrating technology into their lessons, maintain and manage the computer laboratories, assist other teachers with the technical problems they cannot cope with, and deal with other matters such as designing and managing school databases, preparing official websites, updating educational websites, installing and

integrating new maintenance programs, and so on. Furthermore, as teachers, they also have to cope with, and help beginning teachers cope with, the problems identified by Veenman (1984): classroom discipline; motivating students; dealing with individual differences; assessing students' work; managing relationships with parents, organizing class activities, coping with inadequate teaching materials and supplies, and dealing with the learning problems of groups and individuals. These problems are common to most if not all classrooms but can be dealt with through experience and reflective practice. However, when ICTs are introduced into classroom teaching, further problems emerge.

Strudler et al. (1999), for example, investigated the needs and concerns of first-year teachers with regard to ICTs through a two-phase survey study. Findings indicated that access to computer resources and supports for ICT integration are major problems in many schools and that teachers in training are not adequately trained to teach with the technology and so are unable to manage their classes and classrooms to make the best educational use of ICTs. Wicklein (2005) lists critical issues and problems in technology education from an analysis of survey data collected from 296 K-12 teachers, university professors, and supervisors. The top five critical problems in ICT-based education were an insufficient number of qualified computer teachers; inadequate understanding of ICT-based learning and the resource and management requirements by administrators and counselors; inadequate understanding on the part of parents and the wider community concerning technology education; increased high school graduation requirements and the demands of examinations impacting technology education programs; and inadequate financial support for such programs.

Studies conducted in the Turkish context reveal similar findings. Deryakulu and Olkun (2007) carried out a qualitative study into computer teachers' problems by analyzing teachers' inputs into online forums. They found that computer teachers experienced problems over unfair appointments and placement policies, unprofessional administration, role conflicts, insufficient technological infrastructure, lack of technical support, and disorganization in the implementation of elective courses. Similarly, Akbaba-Altun (2006) conducted a comprehensive qualitative study with Turkish school principals, computer coordinators, and supervisors to identify the issues related to ICT integration. Participants in this study identified the main areas of difficulty in ICT classrooms: infrastructure; personnel; curriculum; administration; and supervision.

Additionally, Kiyici and Kabakci (2006) carried out a qualitative study to reveal the types of problems encountered by computer teachers. They analyzed online discussions between graduates from several CEIT departments in Turkey and found that problems of computer teachers could be grouped under four categories: instructional; administrative; technical; and personal. The instructional problems were related to curriculum, course hours, course materials, planning and evaluation in teaching, teaching methods, classroom management, coping with large classes, and sustaining higher levels of student achievement. The administrative problems included issues related to job definition, role conflicts among teachers, legal rights, and institutional decision-making. Technical problems involved issues such as the

suitability of computer laboratories, technical support, ease of use, and access to technical facilities. The personal issues concerned personal time management, work stress, and professional empathy.

The current study builds on the Kiyici and Kabakci (2006) study by developing and administering a Likert-type questionnaire comprising the items revealed through the qualitative analyses of these two researchers' findings. The perceived problems of computer teachers were also enquired into regarding several background variables. The first variable of interest was gender. Becker (1994) conducted a study which investigated the differences between exemplary computer-using teachers and other teachers. Findings indicated that the background and activities of male teachers differed sharply from those of female teachers. More specifically, male teachers were found to use school computers for twice as long as the female teachers. The extent of usage was even greater when home use was taken into account. Taking these difference into account, plus the fact that males typically have different patterns of interest which are numerical, technical, and mechanical (Becker, 1994), it might be hypothesized that male teachers will have fewer problems with computers. However, there are studies which maintain no differences between males and females in terms of IT skills. For example, Walton-Todd (2006) conducted a study to investigate how many of the information technology teachers in the Chicago Public School System accorded with the national technology skills standards. These teachers were surveyed regarding their technology preparation, skills, experience, and general background to establish whether, in fact, they had sufficient background to implement National Educational Technology Standards (NETS), National Standards for Business Education (NSBE) and Secretary's Commission on Achieving Necessary Skills (SCANS). The study revealed no significant difference between males and females in any of the competencies required in meeting these standards.

The second variable of interest was participants' educational backgrounds. Akpinar (2003) administered a survey to 510 Turkish teachers to ascertain the extent of K-12 school teachers' use of technological resources and the effects of their pre-service teacher training on this usage. It was found that teachers graduating from different faculties differed significantly in their uses of ICTs inside and outside the classroom.

The target population for the current study was graduates of education faculties and graduates of technical education faculties. It was surmised that graduates of education faculties might be better equipped with the knowledge and skills necessary to apply appropriate pedagogical strategies in their classrooms because their training involves more focused courses dealing with contemporary pedagogy. On the other hand, the training provided by technical education faculties may be expected to place greater emphasis on the technical aspects of computing. Both faculties train teachers, but education faculties train teachers for primary and secondary educational institutions, while technical education faculties train technical teachers to work in technical high schools as methods-course instructors and work-room supervisors. Considering the lack of sufficient training opportunities for existing teachers (Ajwa, 2007), it was hypothesized that graduates of education faculties might encounter more technical problems, while the graduates of the technical education faculties might have more instructional problems.

The final variable of interest was experience. Departments of computer education and instructional technologies (CEIT) graduated their first students in 2002. The majority of computer teachers employed in K-12 institutions have been these graduates. Computer teachers with five or more years of experience are either graduates of technical education faculties, or education faculty graduates who have completed alternative computer certificate programs or in-service training. Thus, a discrepancy between the perceived problems of novice teachers and experienced teachers might be expected.

The study first addressed the perceived problems of computer teachers considered to be most serious: instructional, administrative, technical, and personal problems. Subsequently, these problems were investigated to see whether they varied according to the following variables: gender, educational background, and experience. The aim then was to consider the implications of the findings for policy-makers.

Method

Participants

Seventy-eight computer teachers working in the city of Eskişehir in the academic year 2005-2006 constituted the population of the study. As all researchers worked in Eskişehir, the procedure can be considered as convenience sampling. Eskişehir is considered a metropolitan city by the government and is located in northwest Anatolia. Most educational research and government surveys and applications are piloted in this city first. The whole computer teacher population in Eskişehir was used in the study. That is, computer teachers working in both elementary and secondary schools constituted the sample. Table 1 presents the demographic background of the computer teachers participating in the study. As shown in this table, the return rate constituted 92 percent of the computer teacher population in the city which was 78 during the time of data collection.

Table 1

Participants' Demographic Information

Variable of interest	Levels of the variable	N	%
Gender	Female	26	36
	Male	46	64
Teaching Experience	0 to 1 year	17	23
	2 to 4 years	43	60
	5 years and above	12	17
Educational background	Education Faculty	47	65
	Technical Education Faculty	24	33
	Missing	1	2
Total		72	100

Instrument

In line with the reviewed literature, the problems that computer teachers might face were categorized as instructional, administrative, technical, and personal. Twenty questions were prepared for each of these, and this constituted the first draft of the data collection tool. Copies of this were then sent to ten field experts for content validity and the questionnaire was revised in the light of experts' feedback. Following this revision, the questionnaire was piloted with ten computer teachers with similar characteristics to the target population. Ambiguous items were revised after the pilot study. The final version of the survey instrument comprised two parts. The first part contained three questions regarding the teachers' demographic background. The second part consisted of 47 items related to instructional, administrative, technical, and personal problems. Statements in this second part were prepared as Likert-Scale items. In preparing the statements, the qualitative data from the Kiyici and Kabakci (2006) study was particularly helpful. Participants were asked to rate their agreement with the given statement on 5-item scales: strongly agree (5), agree (4), neither agree nor disagree (3), disagree (2), and strongly disagree (1). The reliability coefficients were calculated for the data coming from 72 teachers. The portion focusing on instructional problems had twenty items with an internal reliability coefficient of .80. Administrative problems had nine items with a reliability coefficient of .72. Technical problems had ten items with a corresponding reliability coefficient of .84. Personal problems had eight items with a reliability coefficient of .71.

Procedure

Eskişehir National Education Provincial Directorate was asked for written permission to administer the questionnaires to all computer teachers in the city. Seventy-two out of 78 questionnaires were returned—a return rate of 92.3%.

Thus, items in instructional, administrative, technical, and personal problems were calculated first. To establish which types of problems were considered serious by the participants, one-sample t-tests were conducted to compare the means of items with the neutral value of 3. To see whether these problems vary according to gender and the educational background of teachers, independent-samples t-tests were conducted. Finally, to see whether these problems vary in accordance with teaching experience, one-way between-groups ANOVAs were conducted.

Findings and Results

Which types of problems are considered most serious by computer teachers? To find the answer to this research question, four one-sample t-tests were conducted. The critical significance value of .05 was divided by the number of tests conducted (i.e. 4) to reduce the likelihood of conducting a Type I error as suggested by Huck (2000). The procedure is called Bonferroni Adjustment, which reduced the critical significance value to .0125. Table 2 summarizes the tests:

Table 2

One-Sample T-Tests Comparing Group Means With the Neutral Value of 3

Problems	Mean	SD	Df	t	sig.
Instructional	3.15	0.65	71	2.004	0.05
Administrative	3.24	0.71	70	2.901	**0.005***
Technical	3.22	0.92	71	2.028	0.05
Personal	2.59	0.64	71	-5.450	**0.001***

As shown in Table 2, instructional and technical problems were not significantly far away from the neutral value of 3. Administrative problems had a mean of 3.24 with a corresponding significance of .005, indicating that they are the most serious problems encountered by computer teachers. Since one participant did not respond to administration related items, the degree of freedom is 70 rather than 71. Personal problems had a value of 2.59, which was significantly below the neutral value indicating that personal problems were not considered serious by the participating computer teachers.

Among administrative problems, statements with the highest means were, "The school administration does not have a clear definition of our duties ($\overline{X}$=3.68)," "The administration considers us as technical staff rather than computer teachers ($\overline{X}$=3.90)," "I have several additional duties such as maintaining the computer laboratory ($\overline{X}$=3.96)," and "Other teachers always ask for additional tasks regarding computers ($\overline{X}$=3.54)."

Do these problems vary according to gender? It was hypothesized that only technical problems would vary in accordance with gender. Results of the independent-samples t-tests confirmed this hypothesis as shown in Table 3 below:

Table 3

Independent-Samples T-Test Comparing Males and Females In Terms of Technical Problems

Gender	N	$\overline{X}$	SD	df	t	sig.
Female	26	3.57	0.76	70	2.541	**0.013***
Male	46	3.02	0.95			

As summarized in Table 3, technical problems differed according to gender. Females ($\overline{X}$=3.57) had significantly more technical problems than males ($\overline{X}$=3.02). On the other hand, instructional problems (t_{70}=.456; p<.65), administrative problems (t_{69}=-1.489; p<.14), and personal problems (t_{70}=-.697; p<.49) did not vary in accordance with gender.

Do these problems vary according to educational background? As shown in Table 4 below, technical and instructional problems varied in accordance with educational background, whereas administrative (t_{68}=.248; p<.805) and personal problems (t_{69}=.539; p<.592) did not vary according to educational background. Education faculty graduates experienced significantly more technical problems than the technical education faculty graduates. On the other hand, the technical education faculty graduates had significantly more instructional problems than the education faculty graduates. This confirmed the original hypothesis.

Table 4

Independent-Samples T-Tests Comparing Graduates of Education Faculties and Technical Education Faculties in Terms of Instructional and Technical Problems

Variable	Educational background	N	$\overline{X}$	SD	df	t	sig.
Instructional Problems	Education Faculty	24	2.76	0.40	69	3.980	**0.001***
	Technical Education Faculty	47	3.39	0.67			
Technical Problems	Education Faculty	47	3.51	0.80	69	4.289	**0.001***
	Technical Education Faculty	24	2.62	0.87			

Do these problems vary according to experience?

Instructional ($F_{2, 69}$=1.613; p<.207), administrative ($F_{2, 68}$=.395; p<.675), and personal problems ($F_{2, 69}$=.353; p<.704) did not vary according to years of experience, whereas technical problems differed according to experience ($F_{2, 69}$=4.545; p<.014). Descriptive statistics regarding computer teachers' technical problems with regard to experience are provided in Table 5 below:

Table 5

Descriptive Statistics Regarding Computer Teachers' Technical Problems with Regard to Experience

Experience	N	$\overline{X}$	SD
0 to 1 year	17	3.09	0.79
2 to 4 years	43	3.44	0.90
5 and more years	12	2.60	0.91

As shown in the table, teachers with five and more years of experience appear to have fewer technical problems than the other two groups. The ANOVA summary provided in Table 6 indicates that the difference among the groups in terms of technical problems is statistically significant.

Table 6

Anova Summary Table Comparing Computer Teachers' Technical Problems with Regard to Experience

Source	SS	df	MS	F	Sig.
Between Groups	6.995	2	3.497		
Within Groups	53.097	69	0.77	4.545	**0.014***
Total	60.092	71			

To identify the source of this difference, multiple comparisons were conducted. Before choosing the appropriate test of multiple-comparisons, it was necessary to see whether the homogeneity of variances assumption was met. The Levene statistic was calculated to check for the assumption. The F value of .504 with a corresponding significance of .607 revealed that the assumption was met. Thus, the Scheffe procedure was preferred as the multiple-comparisons technique (Field, 2000). Multiple comparisons revealed that teachers who had two to four years of experience ($\overline{X}$ =3.44) had more technical problems than teachers who had five and more years of experience ($\overline{X}$ =2.60) at a probability value of .017.

Conclusions and Recommendations

This study investigated the instructional, administrative, technical, and personal problems encountered by K-12 computer teachers. The main problems experienced by the computer teachers surveyed in this study were administrative. This finding was in line with the findings of Deryakulu and Olkun's (2007) study in the Turkish schools, particularly regarding unfair appointment and placement policies, unprofessional administration, and role conflicts. This finding also supports Wicklein's (2005) claim that inadequate understanding by administrators and counselors concerning technology education is a critical problem. As also indicated by Akbaba-Altun (2006) for the Turkish context, Turkish administrators, school inspectors, and principals do not have sufficient knowledge about the potential of ICT integration and the complexities of implementation, and as a consequence either neglect the computer teachers and their needs or are incapable of serving these needs. This finding suggests that these personnel should be given more training in leadership and the management and pedagogical aspects of ICT integration in schools.

Female teachers were found to encounter more technical problems than male teachers, but on the other hand, instructional, administrative, and personal problems did not vary according to gender. This finding refutes Walton-Todd's (2006) finding, which indicated no significant difference between males and females regarding their experiences in ICT integration. However, the finding is in line with the Becker (1994) study claiming that the interests of males are more numerical, technical, and mechanical, which leads them to have fewer problems with computers. Moreover, in comparison to American society investigated in the Becker (1994) study, women clearly have more non-work related obligations in Turkey, which might leave them

less time to deal with technical tasks. This finding suggests the need for pro-active approaches to enable women teachers to master the numerical, technical, and mechanical aspects of ICT integration.

As hypothesized, education faculty graduates reported significantly more technical problems whereas technical education faculty graduates reported significantly more instructional problems. This finding was supportive of the study by Akpinar (2003), which maintained that graduates of different faculties differed significantly in their uses of computers. This finding has significant implications for policy-makers and providers of undergraduate computer teacher education programs. The training needs to focus on planning, managing, and teaching in an ICT environment based upon robust evaluation and reflection on the relationship between technology, pedagogy, and student learning. It would also be important that such training should be experiential, not simply theoretical.

Teachers with two to four years of experience reported more technical problems than teachers with five and more years of experience, whereas beginning teachers were between these two groups. Beginning teachers still receive training until the end of their first year in schools. They do not actually have to cope with the kinds of problems experienced by the computer teachers because they mostly follow and assist their mentors during the first year in classrooms. The problems arise with the second year as they begin to assume greater responsibilities. The sharp difference between less experienced and more experienced computer teachers in terms of technical problems may well stem from the participants' differing educational backgrounds. The graduates of CEIT departments have been employed for five years. If computer teachers' seniority is more than five years, they are either graduates of technical education faculties or graduates of education faculties who completed alternative training programs. It is reasonable to expect graduates of technical education faculties to have less technical problems. However, other teachers without any computer background other than alternative computer certificates appear to have fewer technical problems, which make the findings interesting. Kiyici and Kabakci's (2006) study somewhat demonstrates why these teachers have little to no technical problems. Senior staff avoids dealing with technical problems and makes junior staff cope with those problems instead. Moreover, administrators tend to assign drudgery technical tasks to younger staff. Such seniority and hierarchy issues make the work load and technical problems of less experienced teachers more unbearable. This finding suggests the need for roles and responsibilities to be more clearly defined for administrators, computer teachers, and classroom/subject teachers.

Turkish Ministry of National Education has embarked on a commendably enlightened, ambitious, and expensive program for embedding ICT in schools. However, these findings, like those of other studies conducted in Turkish schools, suggest that there has been a serious failure to understand what is entailed in ICT integration and techno-pedagogy. The Ministry recognizes the need for curriculum change and the acquisition of new skills and attitudes. However, to date, it would seem that the leadership, systems, resources, and training need to realize these goals have not been provided at the national, local authority, or school level. This leaves

computer teachers exposed on the front line of change, unsupported in their duties. Again, it is important for policy-makers, administrators, and principals to clarify the job definitions of computer teachers and ensure they can act as educational change agents and supporters of teachers implementing new technologies and methodologies in the classroom and not constrained by administrative problems. Lack of adequate and appropriate ICT training for other teachers increases the responsibilities of these computer teachers and brings about role conflicts and work overload. Thus, overcoming both the administrators' and other teachers' inadequate understanding of the roles, responsibilities, and routines of computer teachers is as important as achieving a better balance between education curriculum and technical education faculties to prepare computer teachers for the needs of the 21st century student.

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Bilgisayar Öğretmenlerinin Algıladıkları Sorunlar

(Özet)

Problem Durumu: Günümüzde bilgi ve iletişim teknolojileri (BİT) eğitim, iş dünyası ve günlük hayatın vazgeçilmezleri arasına girdiği için 21. yüzyılın bireylerini BİT'leri etkin ve bağımsız olarak kullanacak biçimde yetiştirmek büyük önem taşımaktadır. Avrupa, Rusya, Asya, Güney Afrika, Yeni Zelanda ve Avustralya dahil olmak üzere dünyanın birçok yerinde bu tür yetiler öğrencilere ilköğretim ve lise yıllarında verilmektedir. Bu bağlamda, bu kurumlarda görev yapan bilgisayar öğretmenleri, gerek öğrencilerinin bilgisayar okur-yazarlığı kazanmalarında gerekse diğer öğretmen ve yönetim kadrosuna teknoloji desteği sağlamakta en önemli rolü üstlenmektedirler. Son yıllarda yapılan araştırmalar, bilgisayar öğretmenlerinin önemli bir bölümünün alanları ile ilgili çok az eğitim aldıklarını ya da eğitim aldıkları konulara uygun biçimde görevlendirilmediklerini göstermektedir.

Türkiye'de 1998 yılında Bilgisayar ve Öğretim Teknolojileri Eğitimi (BÖTE) Bölümleri açılmadan ve 2002 yılında ilk mezunlarını vermeden önce, farklı alanlardan öğretmenlere hizmet-içi eğitim verilerek teknolojinin sınıfla bütünleştirilmesi gerçekleştirilmeye çalışılmıştır. Ancak bu uygulamanın yetersiz olduğu görülerek BÖTE bölümlerinin açılmasının yanı sıra Temel Eğitim Projesi ile ilköğretim dördüncü sınıftan başlayarak teknolojinin öğretim etkinlikleri ile bütünleştirilmesi için çaba gösterilmiştir. Temel Eğitim Projesi kapsamında Türkiye'de ilköğretimin kalitesini arttırmak ve teknoloji entegrasyonunu gerçekleştirmek amacıyla 300 milyon ABD doları harcanmış, özellikle alt yapıya büyük önem verilmiştir. Yapılan araştırmalar, yapılan büyük harcamalara rağmen teknoloji entegrasyonunun istenen düzeyin oldukça altında olduğunu göstermektedir.

Alanyazında belirtildiği üzere teknolojinin öğretim etkinlikleri ile entegrasyonunda bilgisayar öğretmenlerine önemli roller düşmektedir. Ancak Türkiye'de bilgisayar öğretmenlerinin görev tanımında yaşanan belirsizlikler, teknik eleman konusunda yaşanan sıkıntılar ve idarecilerin teknoloji entegrasyonu kavramını yeterince benimsememiş olmaları gibi nedenlerden ötürü bilgisayar öğretmenlerine, birincil görevlerinin yanı sıra öğretmen ve öğrencilere danışmanlık hizmeti vermekten laboratuvarların bakımını yapmaya, okulun veri tabanı ve teknik hizmetlerini örgütlemekten teknik donanım için gerekli teknik desteği sağlamaya kadar çeşitli sorumluluklar yüklenmektedir. Bu da öğretmenlerin gerek öğretim ve yönetim bağlamında, gerekse teknik ve kişisel bağlamda çeşitli sorunlar yaşamalarına neden olmaktadır.

Araştırmanın Amacı: Çalışmanın amacı bilgisayar öğretmenlerinin algıladıkları sorunları belirlemek; öğretim boyutu, yönetim boyutu, teknik ve kişisel boyutlarda yaşanan sorunları betimlemek ve bu sorunların öğretmenlerin cinsiyetleri, eğitim geçmişleri ve deneyimleri gibi değişkenlere göre değişip değişmediğini belirlemektir.

Araştırmanın Yöntemi: Eskişehir'de görev yapmakta olan 78 bilgisayar öğretmeninden 72'si (% 92), 47 maddeden oluşan Likert tipi veri toplama aracını yanıtlamışlardır. Yönetim boyutu, öğretim boyutu, teknik sorunlar ve kişisel sorunlar için yirmişer madde geliştirilmiş, uzman panelinden yararlanılarak veri toplama aracı 47 maddeye düşürülmüştür. Öte yandan veri toplama aracının her alt bölümü için yüksek iç tutarlık değerleri bulunmuştur. Ölçüm güvenirliğini raporlaştırmak amacıyla Cronbach Alpha değerleri hesaplanmış, öğretim sorunlarına yönelik maddeler için .799, yönetim sorunlarına yönelik maddeler için .72, teknik sorunlara yönelik maddeler için .840, kişisel sorunlar ile ilgili maddeler için .71 değerleri bulunmuştur.

Veri çözümlemek için öncelikle betimsel istatistiklerden yararlanılmıştır. Tek örneklem t testi yardımıyla aritmetik ortalamalar üzerinde yorumlar yapılmış, cinsiyet ve eğitim geçmişine göre sorunların karşılaştırılması amacıyla bağımsız örneklemler için t testi; deneyime göre sorunların karşılaştırılması amacıyla ise bağımsız örneklemler için tek yönlü varyans analizinden (ANOVA) yararlanılmıştır.

Araştırmanın Bulguları: Öğretmenlerin yönetim boyutunda karşılaştıkları sorunların oldukça ciddi olduğu, öte yandan kişisel sorunlar başlığı altında değerlendirilen maddelerin katılımcılar tarafından önemsiz bulunduğu belirlenmiştir. Algılanan teknik sorunların cinsiyet, eğitim geçmişi ve deneyime göre farklılık gösterdiği görülmüştür. Bayan öğretmenler daha fazla teknik sorunla karşılaştıklarını belirtmişlerdir. Eğitim fakültesi mezunları daha fazla teknik sorun yaşadıklarını belirtirken, teknik eğitim fakültesi mezunları daha fazla öğretim sorunu yaşadıklarını belirtmişlerdir. Son olarak, iki ila dört yıl arasında deneyime sahip öğretmenlerin beş yıl ve üzerinde deneyimi olan öğretmenlere göre çok daha fazla teknik sorun yaşadıkları görülmüştür.

Araştırmanın Sonuçları ve Önerileri: Bilgisayar öğretmenleri 21. yüzyılın bireylerini gerekli BİT yetileri ile donatmada en önemli rolü üstlenmektedirler. Ancak çalışmadan elde edilen bulgular, öğretmenlerin görevlerini yerine getirmede yeterince desteklenmediklerini göstermektedir. Özellikle yönetim kaynaklı sorunlar bilgisayar öğretmenlerinin işlerini oldukça zorlaştırmaktadır. Bu bağlamda politika yapıcılar için önemli bir doğurgu, bilgisayar öğretmenlerinin görev tanımlarının daha net ve açık biçimde yapılmasıdır. Ayrıca diğer

öğretmenlerin BİT konusunda yeterli hizmet-içi eğitime tabi tutulmamaları bilgisayar öğretmenlerinin sorumluluklarını daha da arttırmakta, değişik alanlarda rol çatışmalarına neden olmaktadır. Bu nedenle gerek öğretmen ve yöneticilerin bilgisayar öğretmenlerinin rolleri ile ilgili algılarının biçimlendirilmesi, gerekse teknik eğitim fakülteleri ve eğitim fakültelerinin öğretim programlarında gerekli iyileştirmelerin yapılarak öğretmen adaylarının görevleri için daha iyi biçimde hazırlanmaları büyük önem taşımaktadır.

Anahtar sözcükler: Bilgisayar eğitimi, öğretmen eğitimi, öğretmen geçmişi, öğretmen deneyimi, cinsiyet

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Effect of Scale Response Format on Psychometric Properties in Teaching Self-Efficacy

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Abstract

Problem Statement: Many studies in educational and psychological literature revealed that measurement of self-efficacy is important in the field of education because of its key role and relationships with many other variables, which have great influences on education. For this reason, self-efficacy measurements and the development of an effective measurement tool with respect to psychometric properties have become an important issue and major concern.

Purpose of Study: This study was conducted to determine which type of self-efficacy scale response format most appropriately assessed self-efficacy in teaching. At the same time, the use of generalizability theory was proposed as a framework for examining the effect of item response format on performance measures.

Methods: Participants in this study were 307 preservice teachers graduated from various department of education faculty as teacher candidates. Of these preservice teachers, 123 were male and 184 were female. Utilizing factor analysis, forced-entry hierarchial regression, reliability and generalizability analysis, the effect of item response format on the psychometric properties of teaching self-efficacy scales was evaluated.

Findings and Results: The study revealed that scales with response formats ranging from 0 to 100 were stronger than the others regarding psychometric properties. Factor loadings of items on a 0-100 scale were changed between .61 and .83, while factor loadings of likert scales varied from .53 to .74, and the metric scale ranged from .59 to .78. At the same time, proportion of variance and Cronbach alpha of the 0-100 scale was higher than both the metric and traditional likert scale. Study results also showed that the strong discrimination of the 0-100 scale provided an assessment that was not only strongly correlated with performance index, but also predictive of performance in a regression model.

Conclusion and Recommendations: This study suggests that Bandura's guidelines for self efficacy assessment are well grounded and should be considered by the researcher while developing teaching self-efficacy

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assessment instruments. Using a 0-100 scale and considering Bandura's guidelines for self efficacy assessment are likely to provide more precise results in respect of psychometric properties and greatest predictive utility.
Keywords: Self efficacy, teacher self efficacy, scale response format, Generalizability analysis.

The psychological and educational literature devotes great emphasis to the concept of teacher self efficacy. The concept of self-efficacy has received increasing attention in educational research, with a focus on two areas. First, they have examined the link between efficacy beliefs, career choices, and academic achievement (Zimmerman & Kitsantas 2005; Caprara, Barbaranelli, Pastorelli & Cervone, 2004; Mini, 2004; Hampton & Mason, 2003; Elias & Loomis, 2002; Fouad & smith 1996; Betz & Hacket, 1997; Lent & Maddux, 1997). These studies reveal that self efficacy beliefs are good predictors of academic achievement, career choices, and career development. For this reason, self-efficacy and its construct have become an increasingly important concept in educational and psychological literature. Second, teacher self efficacy beliefs and their relation to other educational variables have been investigated by researchers. Self efficacy beliefs of teachers have been explored, and thus found related to many educational variables which effected education and career development. As a result of this research, teacher self-efficacy beliefs have been related to student achievement and motivation (Ashton & Webb, 1986; Midgley, Feldlaufer, & Eccles, 1989; Moore & Esselman 1992; Ross, Gray & Gray,2003), the success of program implementation (Guskey, 1988; Stein & Wang 1988), school effectiveness (Hoy & Woolfolk, 1993), student self esteem and prosocial attitudes (Borton 1991; Cheung &Cheng, 1997), teachers' classroom management strategies (Woolfolk, Rosoff & Hoy, 1990), teacher commitment (Evans & Tribble, 1986; Coladarci 1992), and teacher stress and burnout (Bliss & Finneran 1991). Studies clearly revealed that the study of this construct was important to the field of education. Because of its key role in education, psychology, and counseling, measurement of teacher self efficacy and developing a measurement tool have become an important issue and primary concern (Moran & Hoy 2001). A small number of studies have adressed this issue and provided valuable suggestions (eg. Maurer & Pierce, 1998; Pajares, Hartley & Valiante 2001; Moran & Hoy, 2001). Researchers have questioned which type of scale format has an advantage regarding discrimination and reliability, especially when a traditional likert type scale and 0-100 scale are compared. Pajares (2001) pointed out that scales with response formats ranging from 0 to 100 are appropriate for students graded in school and should result in a greater discrimination index than scales with narrower response options. At the same time Bandura (1997) pointed out that because of less sensetivity and reliability, scales that use only a few steps should be avoided while developing measurement tools. In his quidelines for self efficacy assessment, he also suggested using scales with a response format ranging from 0 to100 (Bandura, 1995).

This study intends to extend research concerned with response format in self efficacy by adding a continious metric scale format in teaching self-efficacy. Thus, besides providing additional evidence that the self-efficacy construct could be

assessed with the type of scale, the research also aimed to demonstrate the effect of the continious response category on psychometric properties of self-efficacy scales. At the same time, this study evaluates whether student performance and scale item characteristics vary accross the item response type; thus, the use of generalizability theory was proposed (Cronbach, Gleser, Nanda, & Rajaratnam, 1972; Shavelson & Web, 1991; Brennan, 1992, 2001, 2003). Generalizability theory may also allow examination of the score variations related to the main and interaction effect of item response type. This paper also provides a brief introduction to and preliminary study of the possible use of generalizability theory when identfying or assessing practical measurement problems, such as how to use generalizability theory for exploring effectivenes of scale response type. Generalizability theory allows development of testing models more sensetive to evidence that individual responses may vary considerably across variability of the scale response format. These can be used as an evidence for which type of scale format is better for revealing individual differences. Reflecting individual differences is important for scale developing procedure. This future of scale can be put out by determining the variance component and G theory.

This study investigates whether the three measures obtained by three types of scale response formats differ in (a) variance components (b) their discriminating indexes (factor loadings and item-total correlation coefficient), (c) their internal consistency and d) their prediction of achievement indexes.

Methods

Participants

Participants in this study were 307 preservice teachers graduated from various department of education faculty as teacher candidates in one of the universities in Turkey. 123 of these 307 students were male and 184 students were female. The study participants came from different districts of Turkey and had different socioeconomic statuses as a result of the central student selection examination implemented over Turkey. Students at the faculty graduated from 8 different department of education faculty as teacher candidates. These departments of education faculty are English Language Teaching, Turkish Language Teaching, Science Teaching, Mathematic Teaching, Pre-school Teaching, Primary School Teaching, Social Sciences Teaching, and Guidance and Counseling.

Measures

The data were derived from student responses of the teacher self-efficiacy scale, which was developed by the researcher. Data collection instruments were implemented for two weeks at the end of the school year. Each student completed three different formated self efficacy scales. These included the traditional likert scale, 0-100 scale, and continious metric scale. In this research, preservice teachers' grade point avarage (GPA) in their school and national personel selection examination results are used as performance indexes. The national staff selection examination is implemented on preservice teachers who graduate from education

faculty every year. As the exam is nationwide, all teachers from different fields take the same exam. This exam assesses preservice teachers' efficacy in teaching. Preservice teachers' grades in their university year were obtained from university archives; student's central staff selection examination results were obtained from the Higher Education Foundation in Turkey (YÖK).

Procedure

Self efficacy scales in teaching were adapted from the teacher efficacy reports of the Ministry of Education in Turkey. In this report, teacher efficacy has been described by the national commission (Ministry of Education [MEB], 2006). Self efficacy scales in teaching consisted of items assessing teacher efficacy in organizing, planning, and evaluating. These were included in the complete instrument, and consisted of three versions of a teaching self efficacy scale that differed only in the manner in which students could provide their responses. Each scale consisted of the same 13 items including teachers' judgement of their confidence in organizing, planning, and evaluation. In version 1 of the scale, teacher candidates were asked how sure they were that they could perform the included skills ranging from 0 (no confidence at all) to 100 (completely confident). In version 2, teacher candidates were asked to respond on a likert format consisting of six options ranging from 1 (no confidence at all) to 6 (completely confident). In version 3 of this scale, teacher candidates were asked to mark on a continious metric scale consisting of a line 11 cm in length. Measurement was obtained by a metric instrument. All three instruments were applied in one day for each department. The application procedure can be explained by two steps. In the first step, during the first half of the day, half of the candidates completed version 1 and version 2 respectively; the group were swapped (those who completed first version 1 now completed version 2, who completed version 2 first now completed version 1) . In the second step, the second half of the day all of the candidates completed version 3. The candidates completed the scales after the researcher explained how to responsd to each scale.

Data Analyses

Exploratory factor analysis of the three scales was first conducted to determine the factoral structure of the scales and to obtain factor loading of each item. Second, the item-total test correlation coefficient was calculated to obtain additional evidence for item validity, and Cronbach's α reliability coefficient was calculated to obtain evidence of internal consistency. Third, regression analysis was conducted to determine which scale score predicted academic performance (achievement) indexes better than the others. Finally,, generalizability analysis was implemented to determine variance components and reflect individual differences. Generalizability theory allows examination of the score variation related to the main and interaction effects of students with various characteristics (Kan, 2007).

Findings and Results

The explatory factor analysis revealed all three scales were composed of one factor. Table 1 shows factor loadings from explatory factor analysis, item-total test correlation coefficient, the percentage of total variance explained, and the reliability coefficients. Figure 1 visually shows the differences between factor loadings of three scale items. Factor loadings demonstrate the relationship between an item and a factor. Factor loadings of .40 or higher were considered strong enough to demonstrate that the item indicates the common factor. Item-total test correlations demonstrate the relationship between item score and total test score. Item total correlation coefficients of .30 or over were considered strong enough to demonstrate that the item is valid.

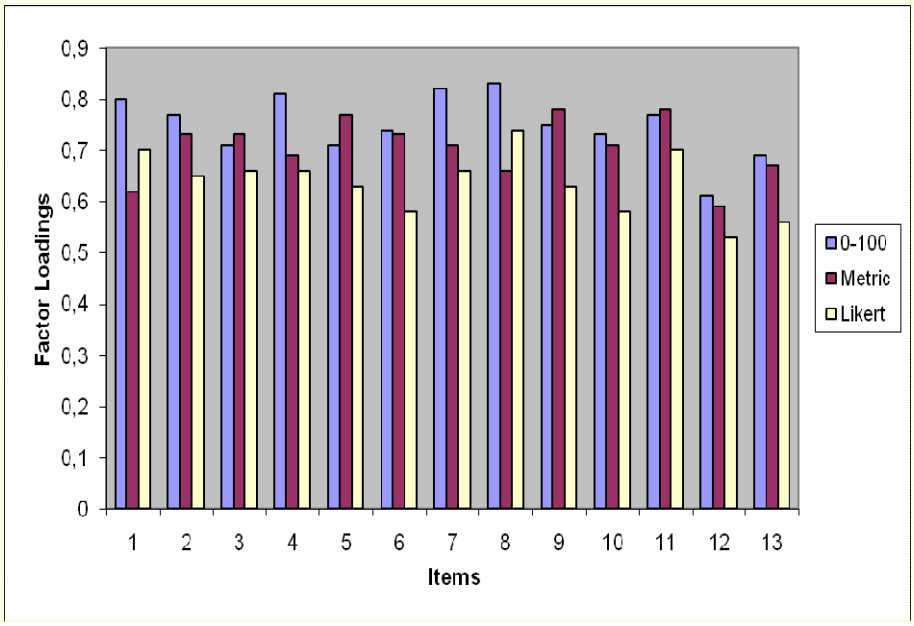

Figure 1. Factor loadings of Likert, 0-100 and Metric Self Efficacy Scales

When the results in Table 1 are examined, it is clear that the items in the 0-100 scale have a greater discrimination index and factor loadings. Factor loadings of items in the 0-100 scale were changed between .61 and .83, while factor loadings of the likert scale varied from .53 to .74; for the metric scale it was ranged from .59 to .78. At the same time, variance proportion of the 0-100 scale was higher than metric and traditional likert scales. Cronbach's alpha (Cr α) coefficient of the 0-100 scale was also quite higher than the likert scale, though it was also similar to the metric scale. A comparison between the three scale format for assessing teaching self efficacy indicates that using a 0-100 scale has some advantage over the other scales (metric and traditional likert) in respect of psychometric properties.

Table 1

Factor Loadings and Item-Total Test Correlation Coefficient of Likert, 0-100, and Metric Self Efficacy Scales With Cr a Reliability Coefficient

Item	Factor Loadings Likert	0-100	Metric
1. Implementing variety of teaching strategies.	.70 (.61)	.80 (.75)	.62 (.56)
2. Creating learning environment for the effective participation of students.	.65 (.56)	.77 (.72)	.73 (.66)
3. Developing measurement tools like rubric, test etc..	.66 (.57)	.71 (.65)	.73 (.66)
4. Providing the acquisition of learning experiences according to the students' physical,emotional, and psychomotor characteristics.	.66 (.58)	.81 (.76)	.69 (.63)
5. Creating learning environments in which students can effectively express themselves.	.63 (.55)	.71 (.66)	.77 (.70)
6. Implementing a variety of assessment strategies (formal, informal)	.58 (.50)	.74 (.69)	.73 (.67)
7. Understanding differences in students' learning styles and providing learning opportunities in compliance with these differences.	.66 (.59)	.82 (.77)	.71 (.65)
8. Using educational technology effectively in classrooms to support teaching.	.74 (.65)	.83 (.78)	.66 (.61)
9. Using teaching methods and techniques within the framework of educational plans and aims.	.63 (.56)	.75 (.70)	.78 (.72)
10. Discovering students' interest and skill and guiding them accordingly.	.58 (.50)	.73 (.68)	.71 (.65)
11. Developing and using teaching material in the classroom.	.70 (.62)	.77 (.72)	.78 (.71)
12. Using time efficiently, taking teaching activities and the aims of the program into account.	.53 (.45)	.61 (.55)	.59 (.53)
13. Designing and implementing educational variables such as motivation, reinforcement, feedback etc..	.56 (.48)	.69 (.63)	.67 (.61)
Explained % of total variance	.41	.56	.50
Reliability coefficient	.87	.93	.91

Note: Item-total correlation coefficients are presented in parentheses.

Correlation between each scale and academic performance indexes have been calculated. This analysis revealed that the 0-100 scale had significantly stronger correlations than both the likert scale and the metric scale with academic performance variables. The 0- 100 scale tended to be better related to both academic variables. As a result of regression, analysis revealed that the 0-100 scale was the best predictor of both outcomes. Moreover, 35 % of explained variance in GPA and 19 % of the explained variance in central personel selection examination results were associated uniquely with the 0-100 scale.

Forced-entry hierarchial regression has been implemented to ensure that simultaneous entry does not mask actual differences in prediction. The likert scale has been entered in the first step, continious metric scale in the second step, and 0-100 scale in the third step. Results of hierarchial regression analysis are presented in Table 1 and 2.

Table 2

Summary of Multiple Regression Models Predicting Academic Performance Indexes

Model	KPSS			GPA		
	R	R^2	R^2 Change	R	R^2	R^2 Change
1	.272	.074	.074	.0383	.147	.147
F		14.358*			30.936*	
2	.274	.075	.001	.387	.150	.003
F		7.255*			15.761*	
3	.471	.222	.147	.602	.362	.213
F		16.943*			33.720*	

P<.001

As a result of this analysis, the likert scale and continious metric scale together accounted for 8 % of the variance for prediction of central personel selection examination results. The entry of the 0-100 scale in model significantly increased the multiple correlation squared (R^2) value to .22 and rendered non significant the predictive value of both the likert scale and the continious metric scale. For the prediction of GPA, the likert scale and metric scale accounted for 15% of the variance; the 0-100 scale entry to the model increased the R^2 value to .36 and rendered the influence of the likert scale and continious metric scale non significant.

Table 2

Multiple Regression Results Predicting Academic Performance Indexes (KPSS and GPA)

	KPSS			GPA		
Result	Likert	Metric	0-100	Likert	Metric	0-100
b	-.042	-.14	-.045	-.036	-.097	.056
Standart error	.18	.057	.008	.16	.053	.007
t	-.23	-2.51	5.80	-.22	-1.85	7.71
p	.81	.013	.000	.827	.067	.000
β	.021	.199	.561	-.18	-.13	.67
R^2		.222			.362	

P<.001

Data in Table 3 indicated that largest effect was attributable to universal score variance only when a person assigned ratings by a 0-100 scale. On the other hand, when a person assigned ratings likert scale or metric scale, the picture changed dramatically; the largest effect was attributable to pxi interaction variance, but universal score variance components were reduced. When the indivudual assigned their response by using the 0-100 scale, the universal score variance increased from 33% to 49%; these reflected quite important differences between universal score variance. This results suggest that assigning ratings using the 0-100 scale has great advantages for reflecting indivudual differences over likert and metric scales.

Table 3

Estimated Variance Components (EVC) and Generalizability Coefficient For 0-100, Likert and Metric Scale

			0-100		Likert		Metric
Source	N	EVC	% TV	EVC	% TV	EVC	% TV
Person	307	83.07	49	.13	33	.961	39
Item	13	10.75	06	.026	07	.128	05
Person x Item		77.52	45	.242	61	1.40	56
G Coefficient			**.52**		**.35**		**.41**

A comparison between three types of scale response format indicated that measurement error related to item facet was almost the same and quite small. This result can be used as evidence that item homogenity has been accomplished by using all three type of scales. Finally, generalizability was examined for efficacy measures by calculating the generalizability coefficient and confidence interval for generalizability coefficient obtained for each scale. A relatively higher generalizability coefficient was obtained when the ratings were assigned by using the 0-100 scale (for 0-100 scale: 0,93; two-sided 95 % CI, 0,9215 - 0,9305; for likert scale: 0,87; CI, ,8542 – 0,8705 and for metric scale: 0,91; CI, 0,8991 – 0,9105).

Discussion and Recommendations

Research results show that the concept of self-efficacy beliefs has an important role in many psychological and educational constructs, and according to Bandura's (1986) social- cognitive theory, indivudual self efficacy beliefs comprise an important role in teachers' actions and decisions. Just like many other areas, this concept is also important for educational literature. Teacher self efficacy especially gets a great deal of attention. It's because of its direct or indirect relationship to a wide range of educational variables from student achivement to teachers' individual development. Teachers with a strong sense of efficacy tend to exhibit greater levels of planning and organization. They also are more open to develop themselves and new ideas, which is important for their development in teaching. When we have a consideration of the relation of teacher self-efficacy with other variables (eg.. student achievement, motivation, student self esteem, and prosocial attitudes etc.), its key role and importance in education could be clearly seen. In this regard, a primary and major concern is that teacher self-efficacy beliefs should be assessed with instruments that posses psychometric properties. Scales are more popular methods for assessing self–efficacy beliefs. For this reason, to report reliability, validity, and item validity indexes of scales is one of the most important issues in educational and psychological measurement. Scales and their item response format are important issues in respect to these psychometric properties. A few studies have adressed this issue and provided valuable suggestions (e.g., Pajares, Hartley & Valiente, 2001; Maurer & Pierce. 1998; Bandura, 1997).

The result of this study supports early research findings. These results are consistent with the findings of Pajares (2001) and the observations of Bandura (1997). This study results showed that Bandura's self efficacy guidelines for many areas are well grounded. Study results revealed that scales with a 0-100 response format were psychometrically stronger than a traditional likert format and continious metric scale. Additionaly, the study also supports the findings of Pajares (2001) that individuals graduated from faculties can indeed make a discriminating judgement using a 0-100 scale. Study results showed that the strong discrimination of a 0-100 scale provided an assessment that was not only strongly correlated with performance index, but also predictive of performance in a regression model. Just like Pajares (2001), the study results also concur with Bandura's (1997) warning that "including too few steps loses differentiating information because people who use the same response category would differ if intermediate steps were included" (p.44).

This study suggests that Bandura's guidelines for self efficacy assessment should be considered by the researcher while developing teaching self-efficacy measurement instruments. Using a 0-100 scale and considering Bandura's guidelines for self efficacy assessment are likely to provide more precise results regarding psychometric properties and greatest predictive utility.

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Özyeterlik İnancını Belirlemek Üzere Kullanılan Ölçek Tiplerinin Psikometrik Özellikler Üzerindeki Etkisinin İncelenmesi.

Özet

Problem Durumu: Psikoloji alanyazınında özyeterlik kavramı üzerinde önemle durulmaktadır ve bu konuda birçok çalışma yapılmıştır. Özellikle son yıllarda özyeterlik kavramı eğitim alanyazınında da büyük ilgi görmüştür. Özyeterlik üzerindeki çalışmalar özellikle iki konuya odaklanmıştır. Birincisi; özyetkinlik beklentisi ile başarı ve kariyer seçimi arasındaki ilişkinin incelenmesidir (Zimmerman & Kitsantas 2005; Caprara, Barbaranelli, Pastorelli & Cervone, 2004; Mini, 2004; Hampton & Mason, 2003; Fouad & smith 1996; Betz & Hacket, 1997; Lent & Maddux, 1997). Bu çalışmalar göstermiştir ki; özyeterlik inancı kariyer seçimi ve akademik başarının iyi bir yordayıcısıdır. İkincisi ise; öğretmen özyeterlik inancı ve eğitimle ilgili değişkenlerle olan ilişkiler üzerinedir (Ashton & Webb, 1986; Midgley, Feldlaufer, & Eccles, 1989; Esselman 1992; Ross, Gray & Gray,2003, Guskey, 1988; Stein & Wang 1988, . Borton 1991; Cheung &Cheng, 1997; Woolfolk, Rosoff & Hoy, 1990). Bu çalışmalar da öğretmen özyeterlik inancının eğitimle ilgili birçok değişkenle yüksek düzeyde ilişkili olduğu saptanmıştır. Eğitimde ve psikolojide çok önemli ve kilit bir rol üstlenmesinden ve birçok değişkenle ilişkili olmasından dolayı özyeterlik inancının ölçülmesi ve ölçme araçlarının geliştirilmesi öncelikli ve önemli bir konu haline gelmiştir.

Araştırmanın Amacı : Bu çalışma ile özyetkinlik ölçeği geliştirilirken kullanılacak madde cevap formatının psikometrik özellikler üzerindeki etkisi araştırılmıştır ve bu yolla öğretmen özyeterliğini ölçmek için psikometrik özellikler açısından en etkili ölçek cevaplama formatının hangisi olduğunu belirlemek amaçlanmıştır.
Araştırmanın Yöntemi : Çalışmada üç ayrı cevaplama formatına sahip (likert tipi, 0-100 ve metrik) öğretmen özyetkinlik formu hazırlanmıştır. Bu formların her biri aynı maddeleri içermekle birlikte sadece cevap formatları değişik tutulmuştur. Farklı cevaplama formuna sahip öğretmen özyetkinlik ölçeği Eğitim Fakültesinden yeni mezun olan 307 aday öğretmen üzerinde uygulanmış ve toplanan veriler üzerinden;
1)Yapı geçerliğine ilişkin kanıt toplamak amacıyla faktör analizi uygulanmış 3 farklı ölçek tipinde elde edilen, varyans açıklama oranları, faktörel yapıları (kaç faktörden oluştuğu), faktör yükleri birbirleriyle karşılaştırılmıştır.
2)Güvenirliğine ilişkin kanıt toplamak amacıyla Cronbach alpha güvenirlik katsayıları, Genellenebilirlik katsayıları ve güven aralıkları belirlenmiş ve birbirleriyle karşılaştırılmıştır.
3)Madde geçerliklerine kanıt sağlamak amacıyla, madde test korelasyonları belirlenmiş ve birbirleriyle karşılaştırılmıştır.
4)Bir ölçüte dayalı geçerliklerini belirlemek amacıyla 3 farklı ölçme aracından elde edilen puanlarla öğrencilerinin KPSS ve üniversitede ilgili derslere (öğretimi planlama ve değerlendirme, gelişim ve öğrenme, rehberlik, materyal geliştirme, sınıf yönetimi) ait akademik başarı ölçüleri arasındaki ilişkiyi incelemek üzere toplanan veriler üzerinde hiyerarşik regresyon analizi yürütülmüştür.
5)Hangi ölçek tipinin bireyler arası farklılıkları daha iyi açıkladığını belirlemek üzere varyans analizi ve Genellenebilirlik teorisinden yararlanılmıştır.
Araştırmanın Bulguları ve Yorumlar : Yapılan analizler sonucunda,
a) 3 farklı cevap formatına sahip ölçek formunun da özelliğe ait tek faktörlü bir yapıya sahip olduğu belirlenmiştir. Bu faktöre ait ve varyans açıklama oranları; faktör yük aralıkları aşağıda verilmiştir.
0-100 ölçeği; Tek faktöre ait varyans açıklama oranı % 56, maddelerin faktör yükleri .61 ve .83 arasında değişmektedir.
Likert tipi ölçek; Tek faktöre ait varyans açıklama oranı % 41, maddelerin faktör yükleri .53 ile .74 arasında değişmektedir.
Metrik ölçek; Tek faktöre ait, varyans açıklama oranı % 50, maddelerin faktör yükleri .59 ile .78 arasında değişmektedir.
b) 3 farklı cevap formatına sahip ölçek formunun güvenirlik katsayıları, madde-test korelasyonlarına ait aralıklar aşağıda verilmiştir.
0-100 ölçeğe ait Cronbach Alpha güvenirlik katsayısı .93 olarak bulunmuş ve madde-test korelasyonları .63 ve .78 arasında değişmektedir.
Likert tipi ölçeğin Cronbach Alpha güvenirliği, .87 olarak tespit edilmiş ve madde-test korelasyonları .45 ve .65 arasında değişmektedir.
Metrik ölçeğe ait Cronbach Alpha güvenirlik katsayısı ise .91, madde-test korelasyonları .53 ve .72 arasında değişmektedir.
c) 3 farklı cevap formundan elde edilen ölçek puanlarıyla akademik başarı ölçüleri (ABP) arasındaki ilişkiye ilişkin regresyon sonuçları aşağıda verilmiştir.

		KPSS		A B P		.
Result	Likert	Metric	0-100	Likert	Metric	0-100
b	-.042	-.14	-.045	-.036	-.097	.056
Standart error	.18	.057	.008	.16	.053	.007
t	-.23	-2.51	5.80	-.22	-1.85	7.71
p	.81	.013	.000	.827	.067	.000
β	.021	.199	.561	-.18	-.13	.67
R^2		.222			.362	

Regresyon analizi sonuçlarına göre, likert tipi ölçek ve metrik ölçekten elde edilen ölçme sonuçları Bireylerin KPSS başarı puanlarının sadece % 8'ini açıklarken, 0-100 cevaplama formatına sahip ölçek aracılığıyla elde edilen ölçme sonuçları regresif modele dahil edildiğinde, ölçekten elde edilen puanların, KPSS başarı puanlarını açıklama oranı % 22'ye yükselmekte ve diğer ölçek tiplerinden elde edilen puanlar KPSS puanlarına anlamlı bir şekilde yordamazken, 0-100 cevaplama formatına sahip ölçek puanlarının KPSS başarı puanlarının anlamlı bir yordayıcısı olduğu görülmektedir. Benzer şekilde likert tipi ve metrik ölçekten elde edilen ölçme sonuçları bireylerin eğitim bilimleri derslerine ait akademik başarılarını anlamlı bir biçimde yordamazken, 0-100 cevaplama formatına sahip ölçek puanları ABP'nin (akademik başarı puanları) anlamlı bir yordayıcısıdır. Bu bulgulara dayanarak, 0-100 cevaplama formatına sahip ölçeğin yardayıcı özelliğinin öz yeterliği ölçmede kullanılan diğer ölçek türlerinden daha iyi olduğu ve dolayısıylada ölçme sonuçlarının bir ölçüte dayalı geçerliğine ilişkin daha iyi kanıt sunduğu söylenebilir.

d) 3 farklı cevap formundan elde edilen veriler üzerinde yürütülen genellenebilirlik analizi sonucunda bireylerden gelen varyans bileşeni 0-100 ölçeğinde toplam varyansın %49'unu, likert tipi ölçekte, toplam varyansın %32'sini ve metrik ölçekte toplam varyansın %39'unu açıklamaktadır. Bu sonuçlar 0-100 cevaplama formatına sahip ölçeğin, ölçülen özellik açısından, bireyler arası farkları ayırt etmede daha iyi sonuçlar verdiğine ilişkin kanıt olarak kullanılabilir.

Sonuç ve Öneriler : Psikometrik özellikler göz önüne alındığında 0-100 cevaplama formatına sahip ölçeğin diğer cevaplama formatına sahip ölçeklerden daha güçlü psikometrik özelliklere sahip olduğu bulgulanmıştır. Bu araştırmanın bulguları ışığında, öğretmen özyeterliğini belirlemek üzere çalışma yapacak akademisyen ve bilim adamlarına öğretmen özyeterliğini ölçmede 0-100 cevaplama formatına sahip ölçeğin kullanmaları, ayrıca özyeterlik dışında birçok alanda da benzer çalışmaların yapılması önerilebilir.

Anahtar Kelimeler: Özyeterlik, Öğretmen özyeterliği, ölçek cevaplama formatı, Genellenebilirlik analizi.

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Effects of Web-Based Spaced Repetition on Vocabulary Retention of Foreign Language Learners

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Abstract

Problem Statement: Computers are considered to be powerful tools supporting the process of teaching and learning, and it has been declared that ICT has particularly changed the language-learning environment and settings. The studies on technology with language learning have usually been comparative studies on the effectiveness of a new technology with more traditional ways of learning. Thus, there is a need for studies evaluating the instructional methodology of technology-supported language learning and teaching environments so that one can determine the nature of learning through technology and why there is a need for method-based educational software.

Purpose of Study: The aim of this study was to examine the effects of web-based supplementary material on intermediate level English language learners' vocabulary retention by presenting the vocabulary items to them through spaced repetitions. WEBVOCLE, a web-based vocabulary learning system in which the contextual presentation of the words was enriched with audio and visual multimedia resources and the retention of the words was enhanced with 'spaced repetitions', was used as a supplementary vocabulary development material.

Methods: Three modules and their repetitions, consisting of texts and exercises such as multiple choice, gap-filling and cloze tests, were made accessible to learners on the web. The study consisted of 69 participants, and it was implemented during the spring semester of 2006-2007. Participants were given vocabulary retention tests to measure their vocabulary development.

Findings and Results: Based on the results of the study, it could be concluded that WEBVOCLE proved to be effective in increasing the retention of participants' vocabulary through spaced repetitions.

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Conclusions and Recommendations: In the study, media was just a mode for instruction to be delivered, and the applied method and pedagogical principles played prominent roles. It is recommended that future designs of computer-mediated language projects should utilize language teaching and learning strategies, methodologies and principles in their instructional design process with the necessary inquiry and precedence over simple technological learning.
Keywords: Web-based education, spaced repetition, interactive language learning environments, vocabulary retention, multimedia

The rapid increase in the use of computers and the Internet has aroused considerable interest in the field of education, leading to an enthusiasm for e-learning ventures. It is a fact that changes in society, business and technology have limited the impact of traditional learning today, and it appears that this will persist in the future. Unfortunately, as expressed by Zemsky and Massy (2003), the revolution that created a rapid expansion of computers and related computer software at educational settings was so rapid, that most of the products were devoid of the necessary research, distant from e-learning realities and lacking in a dominant design.

The studies on language learning through technology have mostly been of a comparative nature and have focused on the effectiveness of using new technology with more traditional ways of learning. Thus, there is a need for further studies to evaluate the instructional methodology of technology-supported language environments. Herron and Moos (1993) have expressed the same concerns by stating that the major obstacle of foreign language teaching is deciding how to integrate new technology into instruction. As suggested by Clark (1983), research studies should focus on the method rather than the media. In his well-known methodology versus media debate, Clark claims that, where learning benefits are at issue, the method, aptitude and task variables of instruction should be investigated. Therefore, this study focuses on the method rather than the media.

Language learners frequently have difficulty in learning new vocabulary and retaining the newly-learnt words. In fact, rehearsals or repetitions have a significant effect on the retention of vocabulary. This has been investigated in many studies (Waring, 2004; Waring & Takaki, 2003; Horst, Cobb & Meara, 1998; Groot, 2000; Webb, 2007, Dobinson, 2006; H. Bahrick, L. Bahrick, A. Bahrick & P. Bahrick, 1993; Fidan, 2003). However, as Wozniak (1995) stated, most of the previous research studies examined the application of equally spaced repetition but not differently spaced repetitions. Moreover, spaced repetitions in periods longer than one week were very scarcely studied (Glenberg, 1980 as cited in Wozniak, 1995). Thus, it is clear that there is a need for further research on spaced repetition procedure measured in longer periods and in unequal repetitions. Moreover, its use in vocabulary learning and retention with varying strategies for the presentation of words and its effect on vocabulary retention in a web-based environment have to be studied as well.

As a conclusion, the purpose of this study was mainly to discover the influence of a spaced repetition design as a supplementary material for English language vocabulary retention on intermediate level university prep class students. Because the applied material was a supplementary retention material, the aim in this study was to elicit the effect of the web-based material on the retention of learnt words. The aim of the material was not to teach the whole content through the online material.

Hatch and Brown (1995) have stated that one sentence context enhances the word-form and meaning association, and use of words by means of meaningful repetition exercises increases the words' retention in one's memory. The lack of context results in difficulty in vocabulary learning and the words taught in isolation are generally not remembered and/or easily forgotten. Moreover, persons learning new vocabulary need a lot of repetition of the same item to store it in their long-term memory. If the word is not truly stored in the long-term memory, one will have trouble in recalling it again.

It is obvious that the lack of a repetitive learning system for the language learner is one of the sources of difficulty for many language courses. The spaced repetition technique originates from the way memory works and is based on the 'dual store theory' which asserts that repeated rehearsals increase the length of stay in short-term memory, which could be encoded into long-term memory (Atkinson & Shiffrin, 1968). This could be further explained with Ebbinghaus's (1885) 'Forgetting Curve'. Most forgetting occurs very soon after the learning takes place. Thus, if a word is not encountered again soon after it is learned, it is more likely to be forgotten. That is, immediately after learning, knowledge decreases rapidly, but after that, it decreases rather slowly. Thus, the time between the first and the second exposition should be relatively short (Waring, 2004).

Regarding spaced repetition, Pimsleur (1967, as cited in Waring, 2004) suggested that when we relearn something, the knowledge gets stronger and it becomes more resistant to decay. Pimsleur's 'Graduated Interval Recall' schedule shows that the gap between the second encounter and the subsequent encounters with the learnt item should progressively widen if there is to be 100% recall. Thus, forgetting slows down as relearning continues. As far as vocabulary teaching goes, this necessitates the fact that the intervals between the revisions of words should increase.

Fidan (2003) compared the effect of repetition provided through the web-based system 'TRAINER' on the vocabulary retention level of preparatory school students in different groups of learners and found that by the end of the 3-week period, students who used 'TRAINER' were able to remember more words than the other group of students who studied words traditionally. There are many studies in the literature indicating that vocabulary gains of the learners increase with 8 or 10 encounters of the target words (Horst et al., 1998; Saragi, Nation & Meister, 1978; Waring & Takaki, 2003). Jenkins, Stein and Wysocki (1984) found that vocabulary gains increase as the revisions of words in context increase. Rott (1999) examined the effects of two, four and six encounters on the incidental gain in knowledge and meaning and found that there was little difference between two and four encounters but there was a significant gain between two and six encounters. Webb's study (2007) supported the earlier findings

and concluded that repetition had a significant effect on vocabulary acquisition. In his study examining the reasons for learners' recall of some words more than others, Dobinson (2006) found that words recalled by 50-74% of learners had a mean of four repetitions and words recalled the least had a mean of one repetition. As Johnson and Heffernan (2006) stated, the results of studies examining the effect of acquisition of a word after a single exposure in a reading context revealed a very low rate of retention.

As Lewis (2000) states, "encountering new vocabulary on several occasions seems to be a necessity and even a sufficient condition for learning to occur" (p. 184). Moreover, establishing similarities and contrasts between the old and the new information and higher involvement with a word increases the chance of retention (Laufer & Hulstijn, 2001). However, studies concerned with the number of encounters necessary for effective vocabulary learning and retention are not consistent in literature, and the exact number of repetitions that would provide perfect retention is still indefinite (Nation & Wang, 1999). As Nation (1990, 2002) stated, to fully acquire words, learners need to be exposed to them 5-16 times, and frequent reencounters with each word are crucial for learners' vocabulary acquisition. In fact, differing results from various studies are related to a number of issues, such as the size of vocabulary, the type of target words (noun, verb etc.), the strategy preferred in the presentation of vocabulary, and meaningfulness of the context (Webb, 2007).

Studies of technology-assisted vocabulary acquisition point out that words could be learned more effectively and in a more enjoyable way with the use of audio-visual devices (Jones, 1999; Labrie, 2000). Many studies confirm that students consider the Internet as a useful tool to learn new vocabulary (Alshwairkh, 2004; Johnson & Heffernan, 2006; Ma & Kelly, 2006) and to supplement in-class instruction (Kung & Chuo, 2002). In addition, use of the Internet and multimedia in language teaching was found to be more meaningful and effective and a life-long experience for learners (Pekel, 2002). In literature, there exist various examples of web-based or computer-based language learning environments such as CAVOCA (Groot, 2000), TELL (Yang & Chen, 2006), the Short Readings Project (Johnson & Heffernan, 2006), and The Tutor (Labrie, 2000), all of which serve these purposes.

Today, by using the web's advantage of time and place flexibility, learners can practice vocabulary with pre-designed spaced repetitions. These repetitions might include the context-based presentation of words with comprehension questions, matching, multiple-choice exercises, etc. in a spaced format and with support multimedia. As Al-Seghayer (2001) suggested, exposing learners to multiple modalities of presentation, such as verbal and visual, produces a learning environment which can have a real impact on vocabulary learning. This could be explained with encoding variability which requires "information to be thought of in a number of different ways" (DeWinstanley & Bjork, 2002, p. 22). The design of multimedia-embedded instruction affects the degree to which learners engage in the cognitive processes required for meaningful learning within visual and verbal information processing systems (Mayer, 2001).

Method

This study aims to answer the following research question:

- Does WEBVOCLE have an impact on the learners' English language vocabulary retention?

The Design of the Tool

WEBVOCLE encompassed the following characteristics:

- Spaced repetitions: Learners were provided with spaced repetition of words (graduated interval recall) in which increasing intervals of time were used between subsequent reviews of the vocabulary items. To guarantee their retention in memory, learners made revisions, which became less and less frequent in time.
- Contextual guesswork: Target words were presented to learners in various contexts and they were encouraged to guess the words' meanings.
- Multimedia embedded instruction: Meanings of target vocabulary items were presented through visual aids and an online dictionary which provided synonyms, pronunciations, and meanings of each word. The first text in each module presented the words with hyperlinks, supported with an online dictionary. Thus, the learners would be able to see and learn the word's pronunciation and collocations and to register and use them in sentences.
- Encoding variability: Use of context-based presentation with audio-visual aids constituted elaborative processing and encoding variability.

The design and the presentation of modules within the web-based material corresponded to the units of the main course book used in the course at school. The study was carried out according to the plan in Table 1. The researchers followed the plan closely.

Table 1
Implementation

Weeks	Modules and Dates	Tests and Dates
1. week	**Module A** (February 20-25**)	Pre-test A*(February 20)
2. week	*Module B*, **A1** (February 27- March 4)	Pre-test B*(February 27)
3. week	Module C, *B1* (March 6-11)	Pre-test C*(March 6)
4. week	C1, **A2** (March 12-18)	
5. week	*B2* (March 19-25)	
6. week	C2 (March 26-April 1)	
7. week	**A3** (April 2-8)	
8. week	*B3* (April 9-15)	
9. week	C3 (April 16-22)	
10. week	(April 23-29)	
11. week	Post-tests* (A,B,C) (May 7-13)	

Note: *Tests A, B, C: English language vocabulary retention tests.
**The dates indicate the period when the modules and repetitive exercises were open to the learners' access.

Three sets of words were presented in **Module A,** *Module B* and Module C within the web-based vocabulary learning system. The words in these modules were taken from the learners' main course book and they were presented in context and followed by a comprehension exercise and vocabulary game in the system (Figure 1, 2 & 3). Vocabulary items in A, B, and C modules differed from each other, and these words had been taught to the learners in class one day before their web-based presentations. By utilizing different sets of words, the researchers were able to measure the effect of revisions on retention with three different applications. Therefore, three different pre-tests concerning the sets of words were implemented. After learners took the pre-tests at school in the morning, they were able to access the system the same day in the evening. The subsequent repetitive exercises covered the following practices in this order:

A1, B1, C1 Repetitive exercise one:

- Choose the appropriate word (in combo boxes)
- Fill in the blanks by writing exercise. (Figure 4)
- Fill in the blanks exercise (drag and drop)

A2, B2, C2 Repetitive exercise two:

- Matching exercise
- Multiple choice test

A3, B3, C3 Repetitive exercise three:

- Puzzle (Figure 5)
- Cloze test

Before opening the web-based material for learners' access , the researchers provided an explanatory session about how to register, how to login and logout of the system, how to move between the pages, how to use other navigation buttons and pop-up windows, how to adjust screen resolution, etc. As stated by Borne (1993), "motivating students to learn is a difficult task since the dawn of civilization" (p. 388) and when it comes to a programmed environment, it is much more difficult. The researchers experienced the same during the implementation of the study; therefore, they continuously reminded participants to use the system.

As previously stated, Ebbinghaus suggested that most forgetting occurs very soon after the learning (1885, as cited in Waring, 2004); thus, the researchers provided the modules as the first repetition of the pre-learned words within 24 hours after their initial exposure in class. The second repetition was one week after that, the third one was two weeks after the first one and the last one appeared three weeks after the third one. Thus, the time intervals between repetitions gradually increased throughout the semester.

Learners were exposed to three modules that included 10 to 12 target words each. In order to prevent possible confusion, only the basic meaning of the word in that context was given. After a module was studied by the learners, it was closed to learners' access. That is, learners were not allowed to study the previous weeks' or months' vocabulary items because the researchers aimed to see the effects of spaced repetition in such intervals.

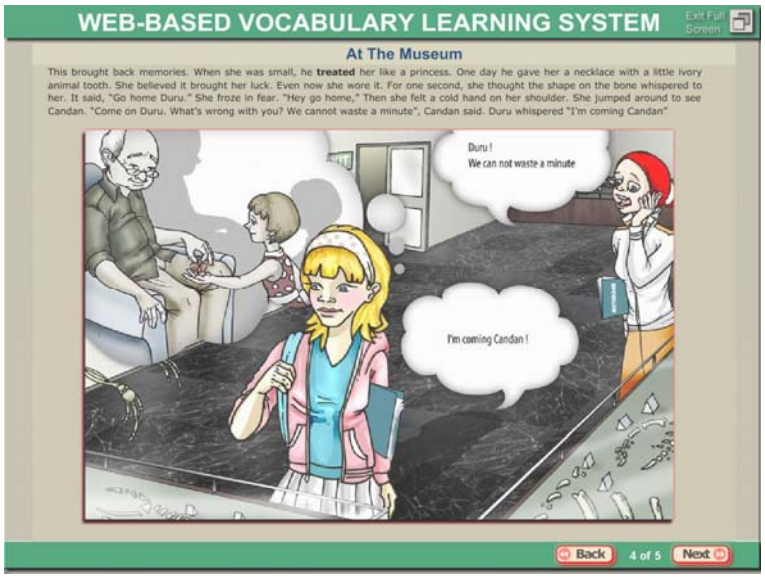

Figure 1. A sample story page

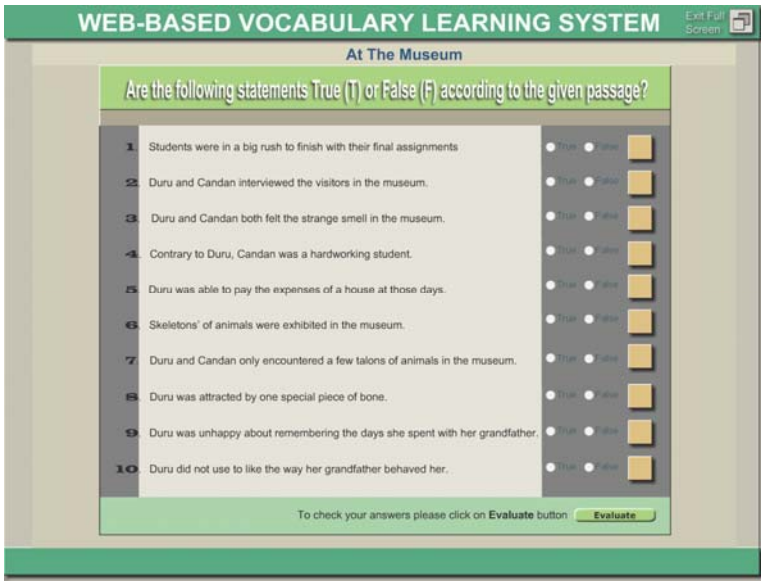

Figure 2. True/False exercise following the story

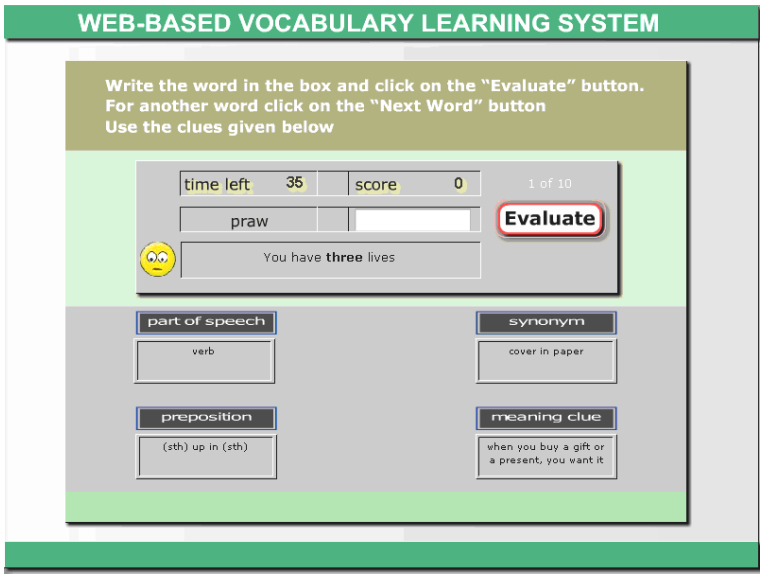

Figure 3. Vocabulary game

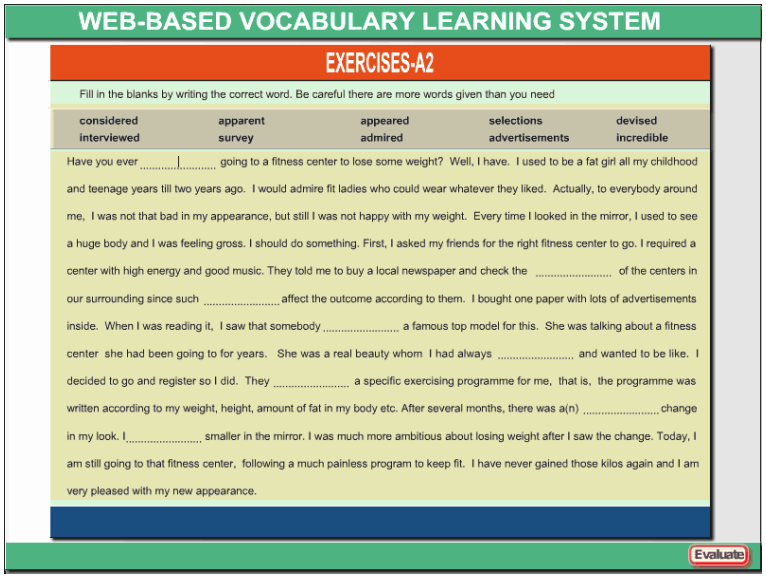

Figure 4. Fill in the blanks by writing exercise

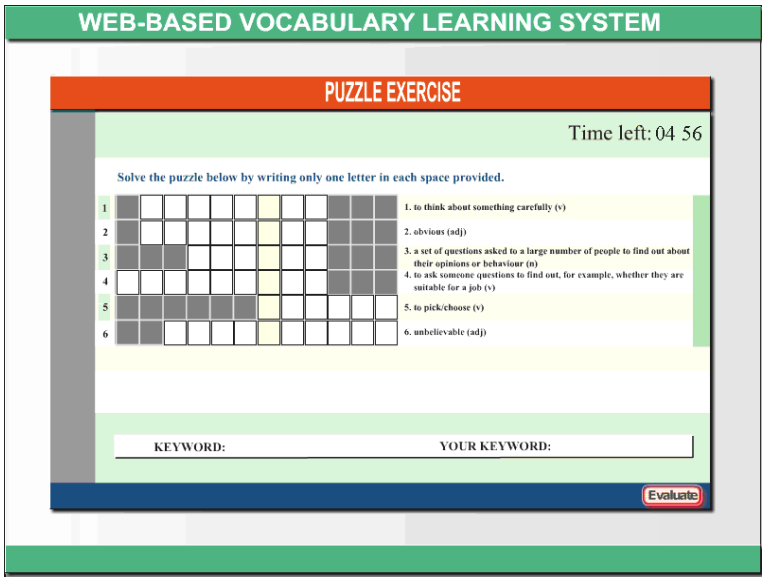

Figure 5. Puzzle

Sampling

The study was carried out with 69 (39 female, 30 male) students in the spring semester of 2006-2007 at Gazi University Preparatory School and lasted one semester. A within-subject design was used in this study with the participants who were exposed to web-based vocabulary again as a supplementary material after class. That is, the material to be used for the present research study enabled the revision of pre-learned vocabulary items. The effect of spaced repetition on vocabulary retention throughout several weeks was investigated. The researchers especially preferred researching prep school students because these students were thought to have a higher rate of access to computers and the Internet on account of their age and the opportunities they were provided through the labs on university campuses, in their residence halls, and at other places such as Internet cafes.

Data Collection Methods and Instruments

Learning evaluation is one of Kirkpatrick's four levels of evaluation (1994) and focuses on learners' development of skills, knowledge or attitudes rather than their satisfaction. In order to gather information about the learners' vocabulary proficiency levels, pre-tests and post-tests were given to learners. The pre-tests were administered after learners' first exposition to target words in class and the post-tests were administered after studying the web-based modules at the end of week 11, as the researchers believed that the results of such a test would better reflect subjects' longer-term retention of words after some time passed. The rationale for the application of the pre-test after in-class exposition of words was that the study investigated the effects of vocabulary revision modules on retention. The web-based material provided revision of the pre-learnt words. After in-class exposition of words, learners' retention rates of those

words were measured. If the pre-tests had not been applied after in-class exposition and before the implementation of the modules, the researchers would not have investigated the effects of revision on retention. After the implementation, the post-tests were applied and retention rates were measured again. It was hypothesized that with the revisions, the learners would be able to retain the words at the same rate or a slightly higher rate just after their in-class exposition.

Because the study investigated the impact of WEBVOCLE on learners' vocabulary retention, the changes in the level of retained words through the process were measured. For measuring the changes, a one–way ANOVA was used. The factor was the number of participation in each application of Modules A, B and C, and the dependent variable was the vocabulary retention level regarding post- and pre-tests' differences. Learners' participation number for each of the four applications of Module A, B and C were recorded during the study, and this data was computed by giving 1 point for each participation number.

Results

There were three English language vocabulary retention tests in the form of a pre-test and post-test for each module of A(9 items), B(10 items) and C(11 items). Each test was applied prior to and after the implementation of each A, B, and C module. Learners' total gain, or the number of words retained before and after the web-based expositions, are presented in Table 2. As demonstrated, there was an increase in the mean pre- and post-test scores, which meant that the number of words that learners remembered increased with time. In order to see each repetition's effect on learners' vocabulary retention, a more detailed analysis with ANOVA was conducted.

Table 2

Means of the Pre-test and Post-test Scores

	Post-test-Pre-test A	Post-test-Pre-test B	Post-test-Pre-test C	Pre-test A	Post-test A	Pre-test B	Post-test B	Pre-test C	Post-test C
N	69	69	69	69	69	69	69	69	69
Minimum	-4.00	-4.00	-3.00	1	1	0	0	0	0
Maximum	7.00	5.00	11.00	9	9	10	10	9	11
Mean	1.9275	.3333	2.6087	4.75	6.68	6.48	6.81	4.57	7.17
Std. Deviation	1.88897	2.03402	2.08790	1.973	2.152	2.343	2.421	2.285	2.651

Results of the pre-test and post-test for Module A. The findings indicated that as learners revised the words within Module A, a moderate increase ocurred in the level of their retention of those words (Table 3). Next, in order to investigate learners' means of pre-test and post-test score differences after completing A, A1, A2, and A3, a one-way ANOVA was computed.

Table 3

The Mean Differences between Learners' Pre-test & Post-test Scores after Completing Module A

Revisions of Module A	*N*	Mean	Std. Deviation
.00	2	-.5000	.70711
1.00	3	.3333	.57735
2.00	13	.9231	2.10006
3.00	14	2.0000	2.28709
4.00	37	2.5135	1.44571
Total	69	1.9275	1.88897

According to the result of ANOVA, there was a statistically significant difference in pre-test and post-test scores' of learners, $F(4,64)=3.67$, $p=.009$ ($p<0.05$) (Table 4). In other words, there was a significant difference in the number of words that learners remembered from Module A before and after using WEBVOCLE, taking into account the frequency of revisions of Module A.

Table 4

The Results of ANOVA Analysis of Module A

ANOVA Post-test A- Pre-test A

	Sum of Squares	*df*	Mean Square	*F*	Sig.
Between Groups	45.305	4	11.326	3.673	.009
Within Groups	197.333	64	3.083		
Total	242.638	68			

Because the test was significant, follow-up tests were conducted to evaluate the pair wise differences among the means. In order to determine the reason for the difference in the application numbers, multiple comparisons were carried out. In order to decide on the right post-hoc procedure, the group's homogeneity-of-variance was checked. The significant value was .29, which was greater than .05; therefore, the assumption of homogeneity-of-variance was not violated (Pallant, 2001) (Table 5). Next, post-hoc comparisons (Tukey HSD) were applied.

Post-hoc comparisons (Tukey HSD) showed that there was not a statistically significant difference between 0 and the other groups, between1 and the other groups, or between 3 and the other groups because p values were greater than .05. However, between the learners with the participation frequencies of 2 and 4, there was a slight significant difference, $p=.05$ ($p<0.05$) (Table 5). This emanated from the learners who had participated in all 4 revisions. It meant that the learners who had revised the words in all 4 practices of Module A remembered slightly more words than the ones who practiced only twice. This might result from the fact that learners' revision of the same vocabulary four times had a positive effect on the learners' retention. In order to better understand what caused such a revision effect on retention in Module A, other modules were examined in the following sections.

Table 5
The Results of Homogeneity-of-variance Test and Post-hoc Comparisons
Levene's Test of Equality of Error Variances Post-test A- Pre-test A

F	*df1*	*df2*	*Sig.*
1.272	4	64	.290

Multiple Comparisons

Dependent Variable: Post-test A – Pre-test A

(I) A Revisions of Module A	(J) A Revisions of Module A	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
.00	1.00	-.83333	1.60295	.985	-5.3329	3.6662
	2.00	-1.42308	1.33373	.823	-5.1670	2.3208
	3.00	-2.50000	1.32737	.337	-6.2260	1.2260
	4.00	-3.01351	1.27475	.139	-6.5918	.5648
1.00	.00	.83333	1.60295	.985	-3.6662	5.3329
	2.00	-.58974	1.12470	.985	-3.7469	2.5674
	3.00	-1.66667	1.11715	.571	-4.8026	1.4692
	4.00	-2.18018	1.05409	.246	-5.1391	.7787
2.00	.00	1.42308	1.33373	.823	-2.3208	5.1670
	1.00	.58974	1.12470	.985	-2.5674	3.7469
	3.00	-1.07692	.67633	.508	-2.9754	.8216
	4.00	-1.59044(*)	.56614	.050	-3.1796	-.0012
3.00	.00	2.50000	1.32737	.337	-1.2260	6.2260
	1.00	1.66667	1.11715	.571	-1.4692	4.8026
	2.00	1.07692	.67633	.508	-.8216	2.9754
	4.00	-.51351	.55097	.883	-2.0601	1.0331
4.00	.00	3.01351	1.27475	.139	-.5648	6.5918
	1.00	2.18018	1.05409	.246	-.7787	5.1391
	2.00	1.59044(*)	.56614	.050	.0012	3.1796
	3.00	.51351	.55097	.883	-1.0331	2.0601

* The mean difference is significant at the .05 level.

Results of the pre-test and post-test for Module B. According to the result of the analysis, when learners revised the vocabulary items in Module B, there was a slight increase in their vocabulary retention. Table 6 gives the means of the differences between learners' pre-test and post-test results after their participation in Module B. In order to investigate learners' means of pre-test and post-test scores' differences according to their revisions of B, B1, B2, B3, a one-way ANOVA was computed.

Table 6

The Mean Differences between Learners' Pre-test and Post-test Scores with Respect to Their Participation in Module B

Revisions of Module B	*N*	Mean	Std. Deviation
.00	6	-1.1667	1.72240
1.00	7	-.5714	1.90238
2.00	13	.0000	2.51661
3.00	16	.4375	1.63172
4.00	27	1.0000	1.92154
Total	69	.3333	2.03402

According to the results of ANOVA indicated in Table 7, there was not a statistically significant difference in pre-test and post-test scores of learners, $F(4,64)=2.12$, $p=.089$ ($p>0.05$). Therefore, there was not a need to conduct any post-hoc analysis.

Table 7

The Results of ANOVA Analysis of Module B

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	32.848	4	8.212	2.115	.089
Within Groups	248.485	64	3.883		
Total	281.333	68			

Results of the pre-test and post-test for Module C. The findings indicated that as learners revised the vocabulary items in Module C, a moderate increase occurred in the level of their retention of those items (Table 8). Next, in order to investigate learners' means of pre-test and post-test score differences according to their revisions of C, C1, C2, C3, a one-way ANOVA was computed.

Table 8

The Mean Differences between Learners' Pre-test and Post-test Scores with Respect to Their Participation in Module C

Revisions in Module C	N	Mean	Std. Deviation
1.00	8	.6250	2.26385
2.00	9	1.6667	1.41421
3.00	21	3.0476	2.31249
4.00	31	3.0968	1.70009
Total	69	2.6087	2.08790

According to the results of ANOVA indicated in Table 9, there was a statistically significant difference in the pre-test and post-test scores of learners, $F(3,65)= 4.49$, $p=.006$. ($p<0.05$). In other words, there was a significant difference in the number of words that learners remembered from Module C before and after using WEBVOCLE, taking into account their revision frequencies.

Table 9

The Results of ANOVA Analysis of Module C

	Sum of Squares	*df*	Mean Square	*F*	Sig.
Between Groups	50.898	3	16.966	4.491	.006
Within Groups	245.537	65	3.777		
Total	296.435	68			

Because the test was significant, follow-up tests were conducted to evaluate the pair wise differences among the means. In order to determine the reason for the difference in the application numbers, multiple comparisons were carried out. In order to decide on the right post-hoc procedure, the group's homogeneity-of-variances was checked. The significant value was .80, which was greater than .05; therefore, the assumption of homogeneity-of-variance was not violated (Table 10). Next, post-hoc comparisons (Tukey HSD) were applied.

Post-hoc comparisons (Tukey HSD) showed that there was not a statistically significant mean difference between 2 and the other groups, but there was a significant difference among the groups with the participation frequencies of 1, 3 and 4 p=.020 and p=.011 ($p<0.05$) (Table 10). This emanated from the learners who had participated in all 4 revisions. There was a statistically significant difference between the learners who had revised the vocabulary items once and the ones who revised them four times. Similarly, there was a difference between the learners who had revised the words once and the ones who revised three times.

Table 10

The Results of Homogeneity-of-variance Test and Post-hoc Comparisons

Levene's Test of Equality of Error Variances Post-test C- Pre-test C

Levene Statistic	*df1*	*df2*	Sig.
.336	3	65	.800

Multiple Comparisons

Dependent Variable: Post-test C- Pre-test C

(I) C Revisions of C	(J) C Revisions of C	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	2.00	-1.04167	.94441	.689	-3.5318	1.4485
	3.00	-2.42262(*)	.80751	.020	-4.5518	-.2934
	4.00	-2.47177(*)	.77074	.011	-4.5040	-.4395
2.00	1.00	1.04167	.94441	.689	-1.4485	3.5318
	3.00	-1.38095	.77434	.291	-3.4227	.6608
	4.00	-1.43011	.73592	.220	-3.3705	.5103
3.00	1.00	2.42262(*)	.80751	.020	.2934	4.5518
	2.00	1.38095	.77434	.291	-.6608	3.4227
	4.00	-.04916	.54930	1.000	-1.4975	1.3992
4.00	1.00	2.47177(*)	.77074	.011	.4395	4.5040
	2.00	1.43011	.73592	.220	-.5103	3.3705
	3.00	.04916	.54930	1.000	-1.3992	1.4975

* The mean difference is significant at the .05 level.

Discussion of Findings

The results of the study demonstrate that WEBVOCLE proved to be effective for retention of the words that had been previously taught in the classroom. Throughout the study, learners were exposed to three modules that included 10 to 12 target words. Learners' vocabulary retention levels for each of three modules, in regards to their participation frequencies and pre-test and post-test scores' differences, were analyzed by computing ANOVA and post-hoc tests. According to the results, the number of words that learners remembered increased in Modules A and C. The results also indicated that the number of words recalled decreased for the learners who did not make any revisions. The difference in the mean scores was particularly observed with the revision number of practices 2 and 4. That is, the learners' vocabulary retention levels increased when they revised the words in all four practices rather than only two practices. Besides this, the mean score differences between pre-post tests were 1.9 for Module A, 0.3 for Module B, and 2.6 for Module C. Learners' vocabulary retention increased the most in Module C, with approximately 2.5 words, and the least in Module B, with less than a word on average; however, learners were still able to retain almost the same number of words that they had learnt prior to implementation of Module B.

However, the size of target vocabulary, the strategy applied, the types of target words, the length of intervals, the use of multimedia, use of an online dictionary, the meaningfulness of contexts that the words are used in, the accepted increase of learners' English language proficiency levels at school, and learners' independent studying of target words other than WEBVOCLE might have affected learners'

performance in post-vocabulary retention tests positively. Moreover, the quality and the quantity of repetitions, learners' extrinsic motivation that was affected by the fear of getting low oral marks, and the presence of the teacher who continuously observed learners' participation in WEBVOCLE might have affected the results of vocabulary retention tests. These students were thought to be highly extrinsically motivated to improve their English language proficiency for the final proficiency exam; therefore, the research might have a different result with a different sample other than intensive English program students.

As suggested by Laufer and Hulstijn (2001), further research could compare vocabulary retention according to varying task involvement load and the number of exposures to the investigated words. The exact number of encounters that leads to perfect retention might be investigated in further studies by controlling the variables, such as the size of target vocabulary, the preferred strategy, the types of target words, use of multimedia, learners' independent studying of target words, the quality and the quantity of repetitions.

Conclusion and Further Recommendations

Current developments in information technologies with computers and the Internet have correspondingly resulted in rapid advances in the application of technology in the field of education. However, most of the researchers have failed to base their studies on the psychological principles of human learning and have only investigated the learners' achievement differences between web-based and conventional training so far. English language teaching in general and vocabulary teaching and learning would benefit from other studies with respect to the effective use of different methods or strategies through ICT and multimedia. Although the integration of computers and the Internet within educational programs is the trend nowadays, educational settings should not adapt it immediately. Rather, they should examine the methods and strategies currently applied for effective teaching with technology. Prior to designing any web material, a designer should keep in mind that web-based education cannot be a duplicated version of face-to-face learning/teaching.

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Web-Tabanlı Aralıklı Tekrarın Yabancı Dil Öğrencilerinin Kelime Hatırda Kalıcılığına Etkisi

(Özet)

Bilgisayar öğrenme ve öğretim sürecini destekleyen en etkin araçlardan birisidir. Bilgisayar ve Internet destekli dil eğitimi materyalleri günümüzde dil eğitiminde sıklıkla kullanılmaktadır. Bilindiği üzere dil eğitiminde etkileşim çok önemlidir. Günümüzde çoklu ortam destekli dil eğitimi materyalleri öğrencilere hem işitsel ve hem de görsel çalışma yapabilme avantajı sunmaktadırlar. Dahası, hem işitsel hem de görsel kanallardan elde edilen bilginin daha iyi öğrenildiği ve kalıcı olduğuna dair çalışmalar literatürde mevcuttur. Bilgisayarlar öğrenmeyi daha etkili hale getirmek amacıyla çoklu ortam desteğini sunmakla kalmayıp özellikle Internet teknolojisi öğrencilerin sınıfta öğrendiklerini tekrar yapabilmesi, ekstra çalışma ve araştırmalar yapabilmesi ve bireysel olarak çalışarak kendi kendine öğrenmeyi gerçekleştirebilmesi gibi çağdaş yaklaşımlarla öğretim imkânları da sunmaktadır. Burada söz edilen öğrenme biçimleri klasik öğrenme yaklaşımından çok daha farklıdır ve bu tür çağdaş yaklaşımların öğrenme çıktılarının çok daha verimli olduğu eğitim uzmanlarınca kabul görmektedir.

Problem Durumu: Daha önce de söz edildiği gibi bilgi iletişim teknolojileri farklı ortamlar ve özellikler sunarak dil öğrenmeye katkıda bulunmuştur. Teknoloji destekli dil öğrenmeye yönelik çalışmalar genellikle geleneksel ortam ile yeni teknolojilerin dil öğrenmeye yönelik katkısını araştıran karşılaştırmalı çalışmalar olmuştur. Dolayısıyla, teknoloji destekli dil öğrenme ve öğretme ortamlarında öğretim yöntemlerinin kullanılması üzerine çalışmalar yapılmasına ihtiyaç vardır. Bu sayede, öğrenmenin teknoloji desteğiyle nasıl gelişeceği ve gerçek anlamda bir dil eğitimi yazılımın nasıl olması gerektiği ile neden yöntembilimi üzerine dayanması gerekliliği anlaşılabilir.

Araştırmanın amacı: Bu araştırmanın amacı web-tabanlı çoklu ortam destekli bağlam modelinde aralıklı tekrarlar ile orta düzeyde İngilizce sözcük öğrenen öğrencilerde öğrenilenlerin hatırda kalıcılığına etkisini ölçmektir. Sınıfta öğrenilen sözcüklerin tekrarları, Pimsleur'un aralıkların açılarak tekrar yapılması yaklaşımı temel alınarak farklı ve düzenli olarak artırılan aralıklarla gerçekleştirilmiş, böylelikle tekrarların öğrenilen kelimelerin hafızada kalıcılığına katkı sağlanması beklenmiştir. Web-tabanlı sözcük öğrenme materyalinde (WEBVOCLE) bağlam içerisinde sunulan sözcüklerin takdimi sesli çevrimiçi sözlük, resim ve animasyonlar ile zenginleştirilmiş, hedef sözcükler boşluk doldurma, çoktan seçmeli alıştırmalar, oyunlar, bulmacalar gibi etkileşimli alıştırmalarla öğrencilere tekrarlattırılmıştır.

Araştırmanın Yöntemi: Bu çalışma 2006-2007 öğretim yılı güz döneminde Gazi Üniversitesi Yabancı Diller Uygulama ve Araştırma Merkezi'nde başlangıç seviyesinde İngilizce eğitimi almakta olan 69 (39 kız, 30 erkek) öğrenci üzerinde uygulanmıştır. Öğrenciler okulda öğrendikleri konulara paralel olarak hazırlanan içeriği web-tabanlı kelime öğretim sisteminde 9 hafta boyunca takip etmişlerdir. Öğrenciler haftalık uygulamalara her bir katılım için birer puan almışlar ve bu sayıların toplamı tüm uygulamalara katılım sayısı

değişkeni olarak atanarak analizlerde kullanılmıştır. Uygulamaların tümü tamamlandıktan 2 hafta sonra 11. haftanın sonunda ise son-testler uygulanarak kelimelerin hatırda kalıcılığı ölçülmüştür. Araştırmacılar örneklem elverişliliği yöntemini uygulayarak veriyi kolaylıkla ulaşabildikleri sınıflardan toplamışlardır.

Bu çalışmada sözcük hatırlama testleri ile niceliksel veri toplanmıştır. Testler ön-test ve son-test şeklinde uygulanmıştır. Ön-testler sözcükler sınıfta öğretildikten sonra uygulanan testlerdir. Son-testler ise tüm uygulamalar tamamlandıktan sonra uygulanan testlerdir. Öğrencilerin sözcük hatırlama oranları web-tabanlı uygulama öncesi ve sonrası uygulanan ön-test ve son-testlerin sonuçları arasındaki farklara bakılarak belirlenmiştir. Verilerin analizi SPSS istatistik yazılımı kullanılarak yapılmıştır. Her modül için uygulamaların analizleri ayrı ayrı yapılmış ve öğrencilerin katılım sayılarına göre grup ortalamalarının ikili karşılaştırılmalarının testi yapılmıştır.

Araştırmanın Bulguları ve Sonuçlar: Öğrencilerden elde edilen veriler göstermiştir ki, öğrenciler hedef sözcüklerin hatırda kalıcılığı açısından ilerleme kaydetmişlerdir. Dahası, ikili karşılaştırma testi sonuçlarına göre öğrencilerin eğitim sistemine katılım sayıları ile hatırladıkları sözcüklerin sayısı arasında ilişki olduğu gözlenmiştir. Öğrencilerin sistemdeki haftalık uygulamaları takip sayıları ile hatırladıkları kelime sayısı doğru orantılı olarak yükselmiştir. Araştırmanın sonuçlarına bakılarak, WEBVOCLE sağladığı aralıklı tekrar imkânı ile öğrencilere daha önce sınıfta öğretilmiş sözcüklerin hatırda kalıcılığını sağlamada katkıda bulunmuştur.

Öneriler: Araştırmada, medya sadece eğitimi öğrenciye ulaştıran bir araç olarak değerlendirilmiş, hedef sözcükler bağlam içerisinde kelime öğretimi metodu ile sunulmuş ve özellikle aralıklı tekrarın sözcük öğrenme üzerinde etkisi üzerinde durulmuştur. Dolayısıyla, araştırmada web dil eğitim ve öğretiminde geçerli metot ve pedagojik prensiplere sahip içeriğin hedef kitleye ulaştırılmasını sağlayan ortamdır. Bu araştırmanın sonuçlarına bakılarak, sonraki teknoloji destekli dil öğrenme ve öğretme araştırmalarında sadece kullanılan teknoloji üzerinde odaklanılması yerine metot, dil öğrenme ve öğretme tekniklerinin üzerinde önemle durulması önerilmektedir. Teknoloji destekli sözcük eğitimi üzerine yapılmış çalışmaların literatürde yer almasının birçok bakımdan faydalı olacağı düşünülmektedir. Dil öğretiminde teknoloji kullanımı yaygındır, ancak piyasada var olan ürünlerin öğretim ilke ve prensiplerine dayandırılarak hazırlanması, öğretimin verimliliğini artıracaktır. Bu araştırmada geliştirilen web-tabanlı dil eğitimi sistemi dil eğitimcilerine kendi derslerinde benzer çalışmaları yapabilmeleri adına örnek olacağı düşünülmektedir. Aynı zamanda bu konu üzerinde çalışan araştırmacılar da bu ve benzeri sistemlerin verimliliğinin artırılması ya da geliştirilmesi üzerine hem farklı teknolojik araçlar kullanımı hem de farklı eğitim yöntemlerinin uygulanması üzerine araştırmalar yapabilirler. Aralıklı tekrar yöntemi sadece dil öğretimi değil farklı derslerin ya da konuların öğretimi için de kullanılabilir. Önemli olan öğretilen içeriklerin tekrarında aralıklı tekrar yaklaşımda önerilen prensibin uygulanmasıdır. Dolayısıyla, bu araştırmanın sonuçlarının farklı alanlarda öğretim vermekte ya da almakta olanlara da faydalı olacağı düşünülmektedir.

***Anahtar Sözcükler*:** Web-tabanlı eğitim, aralıklı tekrar, etkileşimli dil öğrenme ortamları, kelimelerin hafızada kalıcılığı, çoklu ortam.

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Computer Use in Foreign Language Teaching: A Case Study from North Cyprus

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Abstract

Problem statement: In North Cyprus there is a need for understanding and evaluating the use of technology in general and specifically computers in teaching foreign language with a broader perspective. This study can be used by educators to determine how technology can be incorporated better into the professional and academic lives of foreign language teachers in North Cyprus.

Purpose of study: The purpose of this study is to examine the perceptions of foreign language teachers on the use of computers for administrative and teaching purposes in teaching foreign languages in Eastern Mediterranean University (EMU) and compare their perceptions based on gender, age, experience, and education level.

Methods: This study adopted a survey method to examine the perceptions of preparatory school language teachers. The sample of the study was selected by random sampling. It included 50 teachers from EMU's preparatory school in the 2007-2008 academic years. A questionnaire titled "Administrative and Pedagogical Uses of Computers in Foreign Language Teaching" was adopted. For data analysis, frequency and percentage techniques were used to indicate the level of each item. ANOVA was administered to assess whether there was a significant difference in the perceptions of teachers according to their gender, age, experience, and educational level.

Findings and Results: The study found that teachers use computers more for administrative purposes. Although the importance of computers was emphasized, teachers did not use them very much. Except for the age variable, no significant difference was found in the perceptions of the teachers on computer use according to gender, years of experience, or level of education.

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Conclusions and Recommendations: It was concluded that the school administration does not encourage computer use at school, which decreases the teachers' desires for using computers. It is recommended that EMU's administration integrate technology into their programs to support foreign language learning and raise teacher awareness through in-service training courses in this respect.
Keywords: Foreign language teaching, foreign language teacher use of computers, administrative use of computers, pedagogical use of computers

Despite numerous efforts in the field as well as generous expenditures and research, major questions remain unanswered about the use of technology in education. Previously, the actual practices in the classroom have not been studied enough to obtain in-depth information on the quality of technology use by the teachers. The same goes for the studies on teachers' beliefs about technology (Borg, 2003). In fact, it can be concluded that currently, teachers both worldwide (Heafner, 2003) and in North Cyprus are not using much computer technology although they are equipped with the facilities in most cases. For example, in the United States, despite 98 percent accessibility in schools, teachers are reluctant to use technology. In the United States, policy leaders, technology initiatives, and school administrators are encouraging more technology use; however, according to some studies as many as 50 percent of teachers report that they are not using technology in their classrooms (Smerdon et al., 2000). This attitude of teachers toward technology sheds light on the importance of understanding teacher perspectives around the world on using technology.

Two concerns are evident from studies on the use of technology by foreign language teachers. First, it is observed that teachers may effectively use computers in their daily lives; however, they face difficulties adapting their computer knowledge to their teaching practices. Secondly, many research studies indicate that teachers do not use e-mail or the Internet effectively. This is of concern since both are tools well suited for integrating Computer Assisted Language Learning. Moore, Morales, and Carel (1998) investigated how teachers used the Internet to teach culture in the foreign language classroom. They found that teachers with a higher education level tend to use more video, CD-ROMs, and the Internet to teach culture. Teachers with less experience in the classroom use CD-ROMs more compared to experienced teachers; however, they use other technologies less. Moore et al. conclude that teachers use technology in the classroom minimally. A lack of facilities and suitable cultural materials were mentioned as two barriers to this lack of use.

Teachers also benefit from technology since it is useful for managerial purposes such as calculating grades, taking attendance, making handouts, and corresponding with parents. Chiero (1999) investigated the professional use of computers by 142 secondary public school teachers in the United States. She found that nearly 75 percent of the teachers used a computer two to three times a week, and nearly 50 percent used it daily (p. 380). Creating instructional materials was the primary use of the computer followed by administrative tasks (p.380). Lemmon (2002) also reported that elementary teachers used technology for professional productivity. This

included e-mailing colleagues, preparing parent newsletters, creating presentations for parents, grading, and professional research but not much for pedagogical use.

The purpose of the study is to examine the perceptions of foreign language teachers on use of computers for administrative and instructional purposes in teaching foreign languages in North Cyprus. It also aims to compare teacher perceptions based on gender, age, experience, and education level. Research questions are given in the findings and results section.

Method

Research Design

This study employed a survey method to examine the perceptions of preparatory school language teachers at Eastern Mediterranean University (EMU) on computer use and to compare their perceptions based on gender, age, experience, and education level. The aim was to provide an understanding and evaluation of the use of computers in teaching language at EMU to supply a broader perspective.

Sample

The sample of the study was selected randomly from 50 teachers at EMU's preparatory school in the 2007-2008 academic year. Twenty-seven (54 percent) of the teachers were female and 23 (46 percent) were male. According to age, 10 (20 percent) were below 25 years of age, 25 (5 percent) were between 26-35 years of age and 15 (30 percent) were between 36-45 years of age. Seventeen (34 percent) of the teachers had 1-3 years of teaching experience, 25 (50 percent) of them had 4-10 years and 8 (16 percent) had 11-16 years of teaching experience. Half of the teachers had BA degrees and the other half had MA degrees.

Research Instrument

The survey examined administrative and pedagogical uses of computers with a structured questionnaire for foreign language teachers. The questionnaire consisted of three sections: A) Demographics; B) Frequency and Type of Computer Use and C) Beliefs about Technology in the Classroom. The first section consisted of 10 questions; the second, seven questions and 40 items; and the third section, two questions and 24 items.

The original instrument was first used in a dissertation study which focused on administrative and pedagogical uses of computers in foreign language classrooms with Spanish teachers (Cummings, 2005). The instrument was adapted to the case of English language teachers and necessary steps were taken to overcome validity threats. While questions in the first section were developed by the researchers to collect information on the respondents' background, their teaching experiences, and access to computers in their institution, the other two sections were adapted from the instruments in the relevant literature. Section B—adapted from the Teaching, Learning and Computing study by Becker, et al. (1999)—consisted of questions on the frequency of administrative and pedagogical use of technology. Lastly, Section C

involved questions on beliefs. According to the literature on teacher beliefs, there are beliefs about learning (Borko et al., 1979; Smith, 1996 cited in Cummings, 2005), beliefs about classroom management and planning (Breen, 1991; Gatbonton, 1999 cited in Cummings, 2005) and beliefs about using computers for instructional tasks. Questions on beliefs about computers concerning the reliability of the computers, trouble-shooting, confidence, and comfort were adapted from studies by Becker et al. (1999) and Chen, Burnam, Howie, Aten, and Nambirar (2003).

Validity and Reliability

The validity and reliability of research instruments. To ensure the validity and reliability of the instrument, questions were carefully planned to overcome a threat to content validity; therefore, the instrument consisted of sections developed through a review of the existing surveys in literature. Moreover, four instructors who are content experts in the Department of English Language Teaching at EMU went through the survey to confirm the appropriateness of the questions, answers, and categories to strengthen the content as well as the format of the instrument. Also, the survey design was considered carefully to overcome any face validity threats through examining the existing technology instruments in the literature. The internal consistency issue was covered by piloting the instrument with 10 ELT instructors in the Department of ELT at EMU. Cronbach's alpha was determined as 0.85.

Procedure

The responses of 50 instructors were collected through the questionnaires which were returned to the researchers within two days after the instructors completed the questionnaires. It is assumed that all participants answered the questions honestly. This study is limited to selected EMU preparatory school teachers in the 2007-2008 academic year.

Data Analysis

In analyzing the data, a quantitative research approach was used because preparatory school teacher responses to the questionnaire were statistically analyzed according to gender, age, experience, and education level. Frequency and percentage techniques were used to indicate the level of each item. ANOVA was adopted to analyze each item to compare relationships in ratings based on gender, age, experience, and the educational level of teachers. The SPSS 11.0 program was used and an alpha level of 0.05 was set to test each research question.

Findings and Results

1) a. In which administrative activities do foreign language teachers use computers?

Foreign language teachers in EMU use computers weekly to take attendance (52 percent), to make handouts for students (48 percent), and to write lesson plans or notes (42 percent). Teachers use computers occasionally to record or calculate grades (38 percent), to exchange computer files with a colleague (56 percent), and to look for teaching resources (34 percent). Details can be seen in Table 1. These results are

similar to the findings of Woodrow (1991: 479) and Kay (2007: 456-457), who found that teachers need computers for the use of administrative applications such as time tabling and attendance recording, databank applications, test designing, marking, and diagnostic testing applications. Teachers' use of computers for administrative purposes is similar to the findings of the current research.

Table 1

Computer Use for Administrative Purposes

	Do Not Use		Occasionally		Weekly		Almost Daily	
	f	**p**	**f**	**p**	**f**	**p**	**f**	**p**
Record or calculate grades	15	30	19	38	11	22	5	10
Take attendance	12	24	6	12	26	52	6	12
Make handouts for students	1	2	17	34	24	48	8	16
Correspond with parents	34	68	11	22	4	8	1	2
Write lesson plans or notes	4	8	18	36	21	42	7	14
Incorporate digital cameras or scanners when preparing for class	29	58	14	28	7	14	0	0
Exchange computer files with a colleague	5	10	28	56	10	20	7	14
Post student assignments on the Internet	23	46	21	42	6	12	0	0
Build an electronic teaching portfolio	32	64	10	20	8	16	0	0
Look for teaching resources, either professional or "realia"	6	12	17	34	15	30	12	24

1) b. How many hours a week do foreign language teachers use computers for administrative needs?

Teachers who participated in the research mostly use computers one or two hours a week (30 percent) for administrative needs. Only 4 percent of the teachers use computers less than one hour a week. Twenty-two percent of the teachers use computers three-five hours per week; 18 percent of the teachers use them six to eight hours; 12 percent use computers 9-10 hours; and 14 percent of the teachers use computers more than 10 hours a week.

1) c. Which administrative activities are foreign language teachers required to do with computers by the institution?

According to the teachers' perceptions, their institutions require computer use for administrative activities such as calculating grades (58 percent) and taking attendance (72 percent). They are not required to correspond with parents (20

percent), to post student assignments on the Internet (28 percent), or to build an electronic teaching portfolio (18 percent). The attitude of the school administration toward the promotion of computer use is also important as it is similarly argued in Marcinkiewicz (1993). This shows that in the case of the EMU preparatory school, since the administration did not have a policy of promoting the use of computers for administrative purposes such as communication with parents and preparation of portfolios, teachers tended to under use them although computers could be used more effectively.

2) a. In how many lessons in a year do foreign language teachers use computers for teaching purposes?

As seen in Table 2, according to the responses, the time that foreign language teachers use computers for teaching purposes is quite low. Teachers stated that they did not use CD-ROMs (38 percent), presentation software (44 percent), digital videos (70 percent), spreadsheets or database programs (82 percent), or digital images (72 percent) in any of their lessons during one academic year.

Table 2

Computer Use for Teaching Purposes

	No Lessons		1 to 2 Lessons		3 to 9 Lessons		10 + Lessons	
	f	**p**	**f**	**p**	**f**	**p**	**f**	**p**
CD-ROMs (textbook-related or other)	14	38	17	34	7	14	7	14
The Internet	15	30	19	38	12	24	4	8
Presentation software (e.g., Power Point)	22	44	17	34	5	10	6	12
E-mail	12	24	21	42	10	20	7	14
Microsoft Word Skills (e.g., dictionary, spell-check, tables, etc.)	14	28	24	48	7	14	5	10
Show digital video with a computer	35	70	8	16	4	8	3	6
Spreadsheets or database programs	41	82	3	6	2	4	4	8
Digital images (e.g., scanners, digital cameras, Web images, etc.)	36	72	8	16	1	2	5	10

2) b. What are the beliefs of foreign language teachers about using computers for teaching purposes?

In this section, most of the teachers stated that using computers is beneficial for teaching foreign language. As seen in Table 3, teachers indicated that using computers for teaching purposes could be extremely beneficial in teaching listening skills (62 percent), reading skills (64 percent), and about culture (66 percent). Forty percent of the teachers claimed that using computers in teaching speaking skills

could be slightly beneficial. Levin and Wadmany (2006) argue that a teacher's beliefs about computer and technology use for instructional purposes can change, although most of the time they are perceived as constant and difficult to change. However, what is important to note is the fact that change is an "individual process" and each teacher's perception and adoption of technology may vary unconsciously based on the teacher's needs (p. 173). The current research found out that teacher perceptions about the usefulness of computers in foreign language teaching depends on the skills they want their students to achieve; therefore, their perceptions of computers as beneficial changes according to each foreign language skill, i.e., speaking or writing.

Table 3

Beliefs About Computer Use

	Not at all		Slightly Beneficial		Moderately Beneficial		Extremely Beneficial	
	f	**P**	**f**	**p**	**f**	**p**	**f**	**P**
Grammar	2	4	8	16	22	44	18	36
Vocabulary	3	6	23	46	24	46	0	0
Speaking	8	16	20	40	12	24	10	20
Writing	2	4	12	24	25	50	11	22
Listening	3	6	5	10	11	22	31	62
Reading	0	0	3	6	15	30	32	64
Culture	1	2	8	16	8	16	33	66

2) c. Which components of computers do the foreign language teachers use to improve skills?

As seen in Table 4, the respondents in the study reported that they use Microsoft Word in teaching grammar (38 percent) and developing writing skills (82 percent), the Internet in teaching vocabulary (38 percent), developing reading skills (60 percent), and teaching about the culture (26 percent), the presentation software in developing speaking skills (28 percent), and CD-ROMs in developing listening skills (40 percent) more than the other components of computers. It has been reported that foreign language teachers do not use digital video (74 percent), spreadsheets (72 percent), or digital images (74 percent) to improve skills. The findings show that computers are used mostly to improve writing, vocabulary, and grammar skills. Participants said they use computers less in teaching cultural information and developing listening skills compared to other skills. Teachers reported that they use the Internet the most and spreadsheets less in teaching foreign languages.

Table 4

Skills Improvement and Computer Use

	Do not use		Grammar		Vocabulary		Speaking		Writing		Listening		Reading		Culture	
	f	**p**	**f**	**p**	**f**	**p**	**f**	**P**	**f**	**P**	**f**	**P**	**f**	**P**	**f**	**P**
CD-ROMs	11	22	15	30	18	36	8	16	5	10	20	40	7	14	4	8
The Internet	9	18	17	34	19	38	11	22	17	34	7	14	30	60	13	26
Presentation software	21	42	7	14	9	18	14	28	9	18	1	2	5	10	2	4
E-mail	13	26	11	22	12	24	1	2	41	82	4	8	10	20	2	4
Microsoft Word	7	14	19	38	12	24	1	2	41	82	4	8	10	20	2	4
Digital video	37	74	1	2	3	6	7	14	1	2	9	18	0	0	0	0
Spreadsheets	36	72	8	16	2	4	2	4	7	14	0	0	1	2	0	0
Digital images	37	74	2	4	7	14	9	18	1	2	1	2	3	6	5	10

Previous research in the literature supports these findings. For example, Ulusoy (2006) argued that computers can make writing easier when effectively used in the different stages of writing from preparation in the prewriting stage for organizing thoughts to writing itself. Seferoğlu (2005) argued that there is a difference between the students who carried out speaking exercises through conventional methods and students who used the accent reduction software (p. 314). Similarly, Akpinar (2002), argued that the level of understanding of students with access to reading material on the Internet compares favorably with those who do not have Internet access. Furthermore, Gömleksiz and Sertdemir (2005) claimed that using computers for teaching "relative clauses" is more effective for the students' learning than traditional methods. Stevens (2004) stated that Internet and online chatting can open the window of opportunity for language learners to communicate with native speakers, providing access to a wide variety of texts in the language they are learning.

3) Do foreign language teachers use computers more for pedagogical (while teaching) or administrative reasons (behind the scenes preparation and management)?

Twenty-seven (54 percent) of the teachers indicated that they use computers for administrative purposes, whereas 23 (46 percent) stated they use computers for teaching purposes. The findings of the researchers' previous study (2007: 4) suggest that the use of computers for administrative purposes outweighs the use of computers for teaching purposes.

4) a. Is there any relationship between the teachers' perception about the use of computers in foreign language lessons and their gender?

As summarized in Table 5, there is no significant difference between teacher perceptions of computer use in foreign language lessons and their gender ($p > .05$). Previous research does not have a clear answer to the difference in attitudes of male and female teachers toward the use of computers. While some may argue that male teachers are more positive about computers (Gilliland, 1990; Whitley, 1997), other studies state that females are more positive about their use of computers (Kay, 2006). In line with the findings of the current research, still other scholars argue that it is difficult to talk about a difference between male and female attitudes toward the use of computers (Sheingoid and Hadley, 1990; Subhi, 1999).

Table 5

Gender Factor in Teacher Perceptions and Computer Use

	Sum of Square	Df	Mean Square	F	Sig.
Between groups	5.790	1	5.790		
Within groups	1545.3	48	32.194	.180	.673
Total	1551.1	49			

4) b. Is there any relationship between the teachers' perceptions about the use of computers in foreign language lessons and their age?

As provided in Table 6, there is a significant difference between teacher perceptions of computer use in foreign language lessons and their age ($p < .05$). Teachers below the age of 25 showed the most positive attitudes toward the use of computers in foreign language teaching compared to the teachers between 25-36 and 36-45 years of age.

Table 6

Age Factor in Teacher Perceptions and Computer Use

	Sum of Square	Df	Mean Square	F	Sig.
Between groups	197.9	2	98.97		
Within groups	1353.1	47	28.79	3.438	.040
Total	1551.1	49			

Consistent with the current research, Migliorino and Maiden's research (2004) on educator attitudes toward technology reported that the higher the age, the greater

the resistance to the integration of the technology. Toffler (1970, cited in Migliorino and Maiden, 2004) also stated that people are more resistant to change with increasing age. Many researchers indicated that older people have less confidence and more anxiety toward technology than younger people (Migliorino and Maiden, 2004).

4) c. Is there any relationship between the teachers' perception about the use of computers in foreign language lessons and their teaching experience?

Table 7 demonstrates that there is no significant difference between teacher perceptions of computer use in foreign language lessons and their teaching experience ($p > .05$). In his research, Mayya (2007) investigated whether there was a significant difference between "new," "experienced," and "senior" teachers and the factors that motivate a teacher to use a computer. He found no significant difference between "new," "experienced," and "senior" teacher for three of the four factors for computer usage, which concurs with the findings of the current study.

Table 7

Experience Factor in Teacher Perceptions and Computer Use

	Sum of Square	Df	Mean Square	F	Sig.
Between groups	191.128	3	63.709		
Within groups	1359.9	46	29.565	2.155	.106
Total	1551.1	49			

4) d. Is there any relationship between teachers' perceptions about the use of computers in foreign language lessons and their level of education?

Table 8 indicates that there is no significant difference between teacher perceptions of computer use in foreign language lessons and their level of education ($p > .05$). Subhi (1999) also found that teacher attitudes toward computers are not related directly to education level. Jennings (2005) reported that a greater percentage of individuals with non-graduate degrees felt they could use the equipment they had when compared to those with graduate degrees, which implies that education level is not necessarily a predictor of positive attitude toward technology use.

Table 8

Level of Education as a Factor in Teacher Perceptions and Computer Use

	Sum of Square	Df	Mean Square	F	Sig.
Between groups	1.133	1	1.133		
Within groups	1549.9	48	32.291	.035	.852
Total	1551.1	49			

Conclusions and Recommendations

Based on the analysis, the number of teachers using computers for administrative purposes is higher than the number using computers for instructional purposes. However, since computers affect the learning processes of students, it is expected that computers are used more both for teaching and learning purposes in foreign language education inside and outside the classroom. When evaluating computer use in terms of administrative purposes, teachers use computers more for traditional purposes such as taking attendance, writing lesson plans, and recording or calculating grades (see also Bluhm and Visscher, 1990). However, corresponding with parents, building an electronic teaching portfolio, posting student assignments on the Internet, and exchanging computer files with a colleague can be expected to influence teaching processes in a much more positive way. It can also be concluded that teachers in this study use computers more for routine work than for contemporary administrative purposes, The results revealed that the time teachers spend using computers for administrative purposes is quite low, which is very similar to the results of a previous study conducted by the researchers (2007: 4-5). More than half of the participants use computers between 0-5 hours weekly for administrative purposes, which seems to be insufficient. This could be due to the effect of the attitude of the school administration that does not require its staff to use computers for administrative purposes; in other words, there is no formal obligation and inspection for computers to be used at least for some major reasons. Therefore, teachers are free to use computers based on their own needs and desires.

The results regarding teachers' use of computers for instructional purposes is quite interesting. Approximately 80 percent of the participants use CD-ROMs, the Internet, and presentation software either none or in one or two lessons within a year, whereas other systems are almost never used. Despite these findings, teachers indicated that computers play a very important role in developing language skills. Approximately 80 percent of the participants stated that computers are very effective in developing listening and reading skills as well as in facilitating students to learn more about the target culture; nevertheless, they do not use the computers. Gömleksiz (2004) also concluded that although teachers are open to the use of technology in class they tend not to use it themselves. It could be interpreted that teachers and administrators do not have a pedagogical perspective on using computers for teaching purposes and therefore do not see the pedagogical advantages of using computers in foreign language education.

While reporting on the use of computers for teaching purposes, teachers indicated that they use computers more in developing written skills such as reading, writing, and grammar, emphasizing the importance of computers in developing oral skills as well. In developing listening and speaking skills, 'environments outside the classroom' play a very important role (Yıldırım, 2008). Listening to native speakers of the target language and learning about the target culture are two of the important elements required in learning a foreign language. Therefore, foreign language study is different from science, which is confined to the laboratory, or history, which is confined to the classroom. The study of foreign language involves strategies,

concepts, knowledge, and above all, skills. Knowledge and concepts can be taught in the classroom; however, language skills can only be developed through usage, which takes place largely outside the classroom. Computers play a big role in this respect and the Internet could be used for this purpose effectively.

Regarding teachers' attitudes toward the use of computers based on certain variables such as gender, age, teaching experience, and level of education, the study found a significant difference only with the age variable between the attitudes of young and old teachers. This was a predictable result because in a developing country like North Cyprus, older individuals are more likely to resist the use of computers. This could be due to the fact that the use of technology at the Preparatory School has not been adopted at an institutional level. Since the administration does not encourage the use of technology at the school, it could be difficult for the older staff to become accustomed to the use of computers and technology.

The study found no significant difference between teacher perceptions of computer use and years of experience. It was expected that experienced teachers would display more negative attitudes toward computers than younger teachers since they are older; however, the data in this study yielded different results. More experienced teachers showed more positive attitudes toward the use of computers than less experienced teachers, or some of the less experienced teachers in the study showed more negative attitudes toward the use of computers than more experienced teachers. This could be interpreted in two ways; the novice teachers might have developed negative attitudes against computers because the institution they work for does not give the necessary importance to computer use, or the more experienced teachers might have developed positive attitudes toward computer use as a result of the in-service trainings they attended.

There was no significant difference in this study between the female and male teachers' attitudes towards computers. Until recently, males were believed to display more positive attitudes toward the use of computers (Gilliland, 1990; Whitley, 1997). However, some studies have shown that the situation has changed. Females have started to spend more time on computers and give importance to computers in their lives, just as males are doing (Sheingoid & Hadley, 1990; Subhi, 1999). It is widely known that the difference is not in the attitudes of males and females toward computers but with the purposes of using computers (Bain & Rice, 2006). The study indicates there could be differences between the reasons males and females use computers.

Regarding the level of education variable, there was no significant difference between the attitudes of teachers holding a bachelors degree and master's degree. This result indicates that there is no direct relationship between education level and technology use. Teachers holding master's degrees were expected to show a more positive attitude toward the use of technology; however, it was not so. This could be interpreted that teachers holding bachelors degrees have graduated more recently from programs equipped with computers and with an understanding of the significance of computers. In most of the world's undergraduate programs, the

importance and necessity of technology is emphasized and integrated into the curricula so new teachers graduate with a higher awareness of computer use.

It can be concluded that the school administration does not encourage computer use at the school, which affects negatively teacher attitudes toward using computers. This study recommends that preparatory school administration integrate technology into their programs to support foreign language learning and to raise teacher awareness through in-service training courses in this respect. In order to achieve this, the administration is advised to consider some issues that might arise as barriers. Time can be one of the constraints while integrating technology into teaching. In addition, teachers may not be informed of the appropriate models for such integration. Even the absence of hardware and software may become a hindrance to technology use by the faculty. To overcome these issues, the administration may focus on promoting technology through providing incentives and rewards. The administration may create an Instructional Media Center within the school which might function at two levels—teachers may be assisted in developing their courses involving technology and making good and efficient use of technology while teaching. Such a media center can make language teachers feel more confident in technology use since it might provide them with instant assistance when necessary. Besides, this center may supply language teachers with quality materials for the improvement of specific skills. For example, plenty of CD-ROMs may be provided to improve listening skills. Moreover, the specialists in the center may provide teachers with plenty of instructional methods for improving grammar skills. One of those methods involves word processing with Microsoft Word, considered to be the most efficient technology in improving this skill.

Personal interaction between a teacher and students in the class is valuable, but technology use does not need to be confined to the classroom. There are possibilities outside the classroom where a computer can release its enormous potential. Foreign language teachers need to be informed of methods for computer use outside the classroom as well. The Internet is a treasure trove in learning foreign languages, providing latest news reports, video clips, blogs, and chat rooms. It can help a learner reach out to native speakers far away and fellow students in the same city. The teacher can develop the strategy and assign students into small groups to conduct online research, including reading text reports as well as listening to video clippings, to come up with a joint written report followed by classroom discussion. Therefore, the use of computer technology in teaching foreign languages should cover the whole spectrum inside and outside the classroom. The role of a teacher should include that of a facilitator and a coach, not just a classroom presenter.

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Yabancı Dil Eğitiminde Bilgisayar Kullanımı: Kuzey Kıbrıs'tan Bir Örnek

(Özet)

Problem Durumu: Alandaki çeşitli çabalara, harcamalara ve araştırmaya rağmen eğitimde bilgisayar kullanımı ile ilgili temel sorunlar hala güncelliğini sürdürmektedir. Öğretmenlerin eğitim sürecinde bilgisayar kullanım durumları üzerine yeteri kadar (nitelik ve nicelik olarak) çalışma yapılmadığı için derinlemesine bilgi birikimi henüz sağlanmış değildir. Günümüzde hem dünyaya hem de Kuzey Kıbrıs özeline bakıldığı zaman, teknolojik alt yapıya sahip olmalarına rağmen öğretmenlerin bilgisayar teknolojilerini istenilen düzeyde kullanmadığı sonucu karşımıza çıkmaktadır. Kuzey Kıbrıs özelinde yabancı dil öğretiminde bilgisayar kullanımını geniş bir bakış açısı ile anlamaya ve değerlendirmeye çalışmak gerekmektedir. Bu çalışmanın sonuçları ile Kuzey Kıbrıs'taki yabancı dil öğretmenlerinin bilgisayarları akademik yaşamlarına nasıl dahil edebileceklerine yönelik ipuçları sağlamak hedeflenmektedir.

Araştırmanın Amacı: Bu çalışmanın amacı Doğu Akdeniz Üniversitesi'nde yabancı dil eğitiminde bilgisayar kullanımı ile ilgili olarak yabancı dil öğretmenlerinin bakış açılarını irdelemek ve bu bakış açılarını yaş, cinsiyet, deneyim ve eğitim düzeyi gibi değişkenlere bağlı olarak karşılaştırmalı olarak incelemektir.

Araştırmanın Yöntemi: Bu çalışma tarama modelinde betimsel bir çalışmadır. Doğu Akdeniz Üniversitesi 2007-2008 akademik dönemi hazırlık okulundan 50 öğretmen rastlantısal olarak seçilmiştir. "Yabancı Dil Öğretiminde Bilgisayarların Öğretimsel ve Yönetsel Olarak Kullanımı" adlı anket kullanılmıştır. Anketin geçerlik çalışması için alanyazından yararlanılmış ve uzman görüşleri alınmıştır. Anketin güvenirliği için ise

pilot çalışma yapılmış ve Cronbach Alpha değeri 0.85 olarak bulunmuştur. Veri analizinde, her maddenin durumunu belirlemek için frekans ve yüzdelik hesaplamaları yapılmıştır. Öğretmenlerin eğitim düzeyi, yaş, deneyim ve cinsiyetleri ile bilgisayar tutumları arasındaki ilişkileri çözümlemek için ise ANOVA kullanılmıştır.

Araştırmanın Bulguları: Öğretmenlerin bilgisayarları daha çok yönetsel amaçlar için kullandıkları ortaya çıkmıştır. Bilgisayarların önemli olduğu öğretmenler tarafından vurgulanmış ancak bilgisayarların kullanılmadığı belirlenmiştir. DAÜ'deki yabancı dil öğretmenleri bilgisayarları, zaman çizelgesi hazırlama, yoklama yapma, test hazırlama, notlama gibi yönetsel amaçlar için kullanmaktadırlar. DAÜ hazırlık okulunda, yönetimin, velilerle iletişim, öğrenci portfolyoları hazırlama gibi yönetsel amaçlar için bilgisayar kullanımını destekleme gibi bir anlayışı yoktur. Bu durumda öğretmenlerin de etkili bir biçimde bilgisayar kullanmaları beklenemez. Öğretmenler sınıf içerisinde teknoloji kullanımına olumlu bakmalarına karşın uygulama boyutunda yetersiz kalmışlardır. Katılımcıların yaklaşık %80'i CD ROM ve Internet'i yılda sadece 1-2 ders kullandığını ya da hiç kullanmadığını belirtmiştir. Araştırmada, öğretmenlerin yabancı dil öğretiminde bilgisayarların yararlarına ilişkin görüşleri dil becerilerine göre farklılaşabilmiştir. Örneğin bazı öğretmenler bilgisayarların dinleme ve konuşma becerilerini geliştirmede son derece yararlı olduğunu belirtirken bazıları ise okuma ve yazma için yararlı olduğunu belirtmiştir. Araştırma bulguları, bilgisayarların daha çok yazma, sözdağarcığı ve dilbilgisi becerilerini geliştirmek için kullanıldığını göstermiştir. Öğretmenler, kültürel bilgileri öğretmede ve dinleme becerilerini geliştirmede, bilgisayarları diğer becerilere oranla daha az kullandıklarını belirtmişlerdir. Yabancı dil öğretiminde en fazla İnterneti kullandıklarını belirtmişlerdir. Yaş değişkeni dışında, öğretmenlerin bilgisayar kullanımına yönelik tutumları ile cinsiyetleri, deneyimleri ve eğitim düzeyleri arasında anlamlı bir fark bulunmamıştır. Genç öğretmenlerin (özellikle 25 yaş altı) bilgisayar kullanımına ilişkin tutumları daha olumlu olarak belirlenmiştir.

Araştırmanın Sonuçları ve Önerileri: Araştırma sonuçlarına göre bilgisayarları yönetsel amaçlı kullanan öğretmenlerin sayısı daha fazladır. Hâlbuki öğrencilerin öğrenme süreçlerini doğrudan etkilemesi açısından yabancı dil eğitiminde bilgisayarların öğretimsel amaçlı kullanılması çok daha önemlidir. Yönetsel amaçlı bilgisayar kullanımını değerlendirecek olursak, öğretmenler daha çok geleneksel amaçlar için bilgisayar kullanmaktadır. Bunlar ise devam çizelgesi oluşturma, ders planı hazırlama ve notları kaydetmedir. Hâlbuki velilere ulaşmak, portfolyolar oluşturmak, öğrencilere bilgisayardan projeler ve ödevler göndermek, çalışma arkadaşları ile paylaşımlarda bulunmak öğretim sürecini çok daha olumlu etkileyebilmektedir. Öğretmenlerin öğretimsel amaçlı bilgisayar kullanım sonuçları oldukça düşündürücüdür. Öğretmenlerin bir yıl içerisinde öğretim amaçlı bilgisayarlar kullanım süreleri oldukça azdır. Özellikle

dinleme ve konuşma becerilerini geliştirmede sınıf dışı yaşantılarının önemi büyüktür; anadili konuşucularını dinlemek, öğrenilen dile özgü kültürel bilgileri edinmek gerekmektedir. İşte o noktada bilgisayarlara özellikle de Internet kullanımına önem vermek gerekmektedir. DAÜ yönetimi dil eğitiminde teknoloji kullanımına ilişkin programlara ulaşmalı ve hizmet içi eğitim kursları ile öğretmenlerin farkındalığını artırmalıdır. Öğretmenlerin bilgisayarlara karşı tutumları olumludur; o halde sınıf içi dil öğretimi uygulamalarında bilgisayar kullanımını teşvik etmek okul yönetimi için çok zor olmamalıdır.

Anahtar Sözcükler: Yabancı dil eğitimi, yabancı dil öğretmeninin bilgisayar kullanımı, bilgisayarların yönetsel amaçlı kullanımı, bilgisayarların öğretim amaçlı kullanımı

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Evaluating the Impact of Computer Aided Learning Material on Articulation Disorders

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Abstract

Problem Statement: Academic institutions that educate experts in the field of articulation are seemingly limited in number in Turkey. The relevant literature reveals that studies in the area of speaking education are maintained with specialized staff, and computer aided instruction is commonly used. However, not enough computer aided articulation material has been developed for the Turkish language, which has its own distinguished structure.

Objective: Based on both qualitative and quantitative research approaches, the aim of this study is to evaluate the effectiveness of computer aided articulation material that was developed to solve articulation problems for individuals.

Methods: The material in question was tested on 6 students who have articulation problems during a 36 week time interval using a case study method. In order to monitor the effectiveness of the computer aided articulation material in detail, the students were observed over a 12 week period on a weekly basis. After the implementation, as follow-ups, the students were monitored in 24th and 36th weeks to determine whether any change occurred in their articulation and sustaining effects of the implemented programme. All experiences during these processes were recorded with a video camera. Recorded data was viewed by 15 academicians, who represented the following areas of expertise: speaking therapist (1), teaching Turkish (1), special education (1), educational sciences (3), science education (3), mathematics education (2), and computer education (5). In addition, 162 students studying to be teachers at Fatih Faculty of Education from the departments of Turkish (18), Special Education (42), Guidance and Counseling (41), and Computer Education (41) have watched the video recordings.

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Results: The result of the study shows that the articulation of students with disorders in this area was improved significantly by using the developed material. Arithmetic values were calculated for 6 students coded as N, Y, Z, T, U, and V out of 178 participating students. The main finding of the study suggests that the articulation disorders of students can be corrected to a great extent through the use of developed computer aided materials. The developed materials seemingly solved the students' problems related to articulation to a great extent and had positive effects on students' social, psychological, and academic experiences.
Recommendations: In this study, the effectiveness of the developed material was tested and identified. To comply with international standards, further studies should be conducted. Computer aided articulation material can be enriched by adding new dimensions to it to support proper and fluent usage of the Turkish language.
Keywords: Turkish, Articulation Disorders, Computer Aided Learning Material

Throughout history, human beings have used "speaking" as a means of communication. Speaking ability plays a crucial role in the development of individuals and affects their lives socially, psychologically, and academically (Kutlu, Balcı, & Yılmaz, 2007). As a part of natural dialogue, speaking combines with other audio visual elements. While audio elements compose the base line for speaking, lip movements, the visibility of lips, and other hints remove the ambiguity of speaking (Edge & Maddock, 2003). Problems that occur during the development of these audio visual elements create speaking disorders. These speaking disorders can be delineated into different categories (Anonymous, 2004).

Articulation and pronunciation problems are issues for most people who have speaking disorders. Articulation is defined as the process of composing sound through the movements of the lips, tongue, palate, and chin (Ting, Yunus, Vandort, & Wong, 2003). Enunciation is the process of composing words from sounds. Problems with articulation can be organic and caused by functional disorders. Anatomic, motor, and sensorial deficiencies reveal various disorders (Ting et al., 2003). The therapy method is the best known treatment for these disorders. The speaking therapist and language teachers should determine the presence of enunciation problems and provide students with knowledge on how to enunciate properly to support individuals who have disorders (Engwall, Bälter, Öster, & Kjellström, 2006). However, this process is long and laborious, requiring an individual to work hard continuously. The ongoing process should be monitored and evaluated by specialists (Ting et al., 2003). In addition, computer aided procedures can be helpful for language teachers and speaking therapists as they may increase the effectiveness of the therapy (Bunnell, Yarrington, & Polikoff, 2000).

Currently, technology is developing rapidly, and new developments are being actively used in learning environments (Isman, 2005). Using computer aided material for speaking therapies began in the 1980s (Ma & Kelly, 2006). Systems that were

developed with new technologies have become useful in terms of using these systems as a supportive material for language teachers and speaking therapists. They may be used for individual learning applications and for repeated activities. Since the 1980s, a lot of systems have been developed. These systems are divided into the following three categories by Bunnell, Yarrington, and Polikoff (2000): Systems that merely aid speaking without giving feedback; systems that supply feedback to the speaker, including the basic frequencies and amplitude property; and systems that evaluate the speaking. Indiana Speech Training Aid (ISTRA), Speech Viewer, Speech Illumina Mentor (SIM), Speech Training, Assessment and Remediation System (STAR) BALDI, and Articulation Tutor (ARTUR) are examples of some of these systems (Kewley-Port, Watson, Maki, & Reed, 1987; Adams, Crepy, Jameson, & Thatcher, 1989; Soleymani, Mccutcheon, & Southwood, 1997; Bunnell et al., 2000).

Also, some systems have been developed for people who have hearing problems for the purpose of developing their hearing abilities. These systems are mainly developed as three dimensional head models (Massaro, 2004; Balter, Engwall, Öster, & Kjellström, 2005). BALDI is a three dimensional speaking head model and practically speaks like a human (Massaro, 2004). These systems are developed using 3D ultrasound and EPG data to mimic real visual speaking (Cohen, Beskow, & Massaro, 1998; Cohen, Clark, & Massaro, 2001). This system is used for students with hearing problems and new language learners. BALDI was translated into Arabic, Armenian, Spanish, Italian, French, German, Swedish, and Danish in 2005 (Massaro, Ouni, Cohen, & Clark 2005).

ARTUR is a computer aided speaking system that offers data to the user regarding the proper enunciation of sounds. The most important feature of ARTUR is that it gives clear information about the proper method of articulation by showing the inside of the mouth and the movement of all of the necessary parts (Balter et al., 2005). During the development of the ARTUR system, experts from different disciplines worked together, including computer technologists, speaking therapists, and pedagogy specialists (Engwall, 1998; Engwall, 2000; Beskow, Engwall, & Granström, 2003). ARTUR is designed to appear like a teacher who is ready to teach and to record the needs of students in its own working library (Engwall, Wik, Beskow, & Granström, 2004). To determine and evaluate the existing knowledge of users and to make learning easier, ARTUR records users' wording and provides feedback to the users in order to make them see their mistakes and correct them (Eriksson, Bälter, Engwall, Öster, & Kjellström, 2005; Engwall, Bälter, Öster, & Kjellström, 2006).

In Turkey, some research has focused on individuals with speaking problems who do not fit international norms. In Turkey, not enough speaking therapists are available in terms of both quantity and quality (Konrot, 1998). In addition, the utilization of computer technology for speaking education is a new concept in Turkey. Almost no studies have been published regarding articulation disorders, and clear data has not been presented regarding methods of proper articulation when speaking Turkish and using computer aided education procedures. Seemingly, no studies are focused on developing a computer aided system for the Turkish language

showing movements of the mouth during speaking. This study aims to fill this gap. Therefore, the aim of this study is to develop computer aided material related specifically to the Turkish language for addressing articulation disorders.

The Computer Aided Material

The computer aided material that was developed for articulation disorders contains all of the sounds in the Turkish language. Turkish is a language that belongs to the Ural-Altay language family. 29 sounds are in the Turkish alphabet, i.e., 8 vowel sounds and 21 consonant sounds.

Table 1

Turkish Sounds

Vowels	a/ e/ ı/ i/ o/ ö/ u/ ü
Consonants	b/ c/ ç/ d/ f/ g/ ğ/ h/ j/ k/ l/ m/ n/ p/ r/ s/ ş/ t/ v/ y/ z

The material focuses on a head model that can be used to represent the proper production of the 29 sounds of the Turkish language. The lips, tongue, and chin are emphasized in the developed material on the basis of a two-dimensional environment. In the process of the articulation of each sound, side appearances of the teeth, tongue, and chin and front appearances of the lips and teeth are animated. The main menu of the developed model is shown in Figure 1.

Figure 1. The main menu of the model.

The model includes sound. The goal for the head model in this study is to treat articulation disorders that have originated from habits, speaking differences, and local accents and to construct a background for individuals to speak Turkish effectively, comprehensibly, and properly. During the process of creating sounds and numbers, the contact points on the lips can be observed. By using the properties of the provided material, the abstract process is turned into a more concrete process. In addition, the information that is offered through audio and visual means is also been supported with a text-based explanation. Figure 2 and Figure 3 shows menus for the R and E sounds.

Figure 2. The menu for the R sound.

Figure 3. The menu for the E sound.

In this study, the relevant literature has been closely examined in order to glean information to help develop a model that supports correct, clear, and fluent Turkish (Giray, 2001; Demircan, 2001). Resources were reviewed related to the usage of sound; the diction properties; and the length of the words, syllables, diacritical-marks, tonality, and gesture (Taser, 2006; Gurzap, 2007). The examination of relevant literature revealed that studies in this field mainly focus on how to use tools for sounds (Önen, 2004; Vural, 2004).

The material was developed on the basis of relevant literature and interviews of 50 primary school teachers and two specialists working in the area of diction and speaking. In this study, the effectiveness of the computer developed material was investigated. Specifically, answers were sought to following questions:

- Can computer aided material help solve articulation problems?
- How successful is the material in terms of solving and treating articulation problems?
- What social and psychological changes, if any, are involved after solving articulation problems?

Treating and removing the articulation disorders of students through the use of computer aided material is the main goal of this study. The study is limited to only this material. Considering the deficiencies in the number of specialist staff in Turkey, computer aided material can offer a powerful solution. Computer aided articulation systems in Turkey could be commonly offered as an alternative method to the traditional therapy methods.

Method

In this study, a case study method is used with 6 students who have articulation disorders. The students participating in this study were observed for 36 weeks. In the study, the following instruments were used as data collection tools:

Questionnaire I and II

Two questionnaires were prepared for the preliminary study. The final structure for the questionnaires was developed after the pilot study. Questionnaires were administered to the students and their parents during the first week of 36 week period. The aim of the first part of the questionnaires was to collect descriptive data regarding the characteristics of the students, and the second part was designed to identify the articulation disorders of the students and to obtain information about the preliminary work by the students and parents to address their articulation disorders and the effects of the articulation disorders on their social and psychological life. The questionnaires consisted of open-ended questions.

Observations

Six students with articulation disorders were observed during the study. In order to observe the effectiveness of the developed material on the treatment of existing articulation disorders, the students' performances were recorded with a video camera over a 12 week period. The recording and the students' data were offered to 178 evaluators (1 speaking therapist, 15 academicians, and 162 students studying to be teachers). The evaluators defined the level of change for each student through an observation form that was scaled from 0 (i.e., weak) to 100 (i.e., high quality). The observation forms included words that were used for each student. Each student was coded with one of the following letters: N, Y, Z, T, U, and V.

Unstructured Interview

In addition, two different sessions were arranged for interviews with academicians and the speaking therapist in order to discuss the effectiveness of the computer aided material. Furthermore, the students coded N, Y, Z, T, U, and V evaluated themselves at the end of the study through an interview conducted by the author of the study.

Application of Computer Aided Material

The material was administered to 6 students with articulation disorders who were between the ages of 10 and 23. Prior to this study, none of these students had received any therapies for their articulation disorders. First, the results of the questionnaires showed that the parents of the students coded N, Y, Z, T, U, and V accepted their existing problems. Student N, who was 23 years old, waited until age 20 to have an operation for her articulation disorder. However, when she was 20 years old, she was told that the articulation disorder has nothing to do with the operation. The articulation disorders of N originated from bad speaking habits, and she never received special education for her problems. Similarly, the articulation disorders of the students coded Y (20 years old), Z (20 years old), T (14 years old), U (11 years old), and V (10 years old) were identified by their parents and relatives. None of the students received special education for their articulation disorders. The disorders of the 6 students are different from each other as shown in Table 2.

Table 2

Articulation Disorders of Participants

Student	Age	Education	Articulation Disorder
N	23	Graduate Faculty	Problems vocalizing c/ ç/ j/ s/ ş/ z
Y	20	Pre-graduate Two years college	Using ğ/ instead of r/
Z	20	Pre-graduate	Using ğ/ instead of r/
T	14	Primary school	Using ğ/ instead of r/
U	11	Primary school	Using y/ instead of r/
V	10	Primary school	Using l/ instead of r/

At first, in order to identify the articulation disorders of the students, different activities were arranged. For this aim, different words and sentences were provided for students to sound out, and their readings were recorded. The recordings were analyzed by a speaking therapist. The disorders as identified in Table 2 were confirmed by the therapist. After this stage, the students started to practice with the developed material in an effort to overcome their difficulties. The material illustrated to students how to articulate sounds, and students were able to see the appropriate movements of the tongue, lips, teeth, and chin. During the study, sounds with which students had difficulties were recorded. For each student, the study was carried out for 36 weeks, and the process was monitored by the researcher. This process was composed of the following four stages: application, monitoring, follow-up, and observation and evaluation. During the study, students did not work with other therapies or meet with a speaking therapist, and the researcher did not provide students with any additional information. The researcher introduced the material to the students and recorded the students' experiences. The recorded experiences were introduced to evaluators for their interpretations.

Evaluators

Academic institutions that train speaking education specialists in Turkey are very limited. This also limits the number of studies that focus on speaking disorders and other interdisciplinary studies in the field. Although this study was conducted at the Karadeniz Technical University, no academic unit for training speaking therapists or specialists is housed within this University. The related literature shows that the evaluation group should preferably be composed of people who have experience in speaking education. This is a main limitation of this study. The evaluation group for this study is shown in Table 3.

Table 3

Evaluation Group

Quantity	Job Title	Work Area
1	Speaking Therapist, Educator	Speaking Education
1	Academician	Teaching Turkish
1	Academician	Special Education
3	Academician	Educational Sciences
3	Academician	Science Education
2	Academician	Mathematics Education
5	Academician	Computer Education
18	Prospective Teacher*	Department of Turkish Education
61	Prospective Teacher*	Special Education
42	Prospective Teacher*	Educational Sciences
41	Prospective Teacher*	Computer Education

*Prospective teacher refers to a student studying to become a teacher

Recordings taken of the students coded N, Y, Z, T, U, and V were introduced to students studying to become teachers from four different departments. These prospective teachers watched recordings and completed observation forms that were scaled from 0 (i.e., weak) to 100 (i.e., high quality). Observation forms were arranged specifically for each participant. For the academicians and the therapist, two different sessions were arranged. The views and perceptions of the academicians and the therapist were collected through interviews.

Findings and Discussions

The evaluators scored the changes in the sounds produced by each student. The results were analyzed by the researcher on the basis of each evaluator's area of specialty. The results that were obtained from the academicians, the therapist, and the prospective teachers showed that the material was successful in treating the students' articulation disorders. Figures 4 through 14 illustrate the changes in the students' articulation after working with the computer aided material.

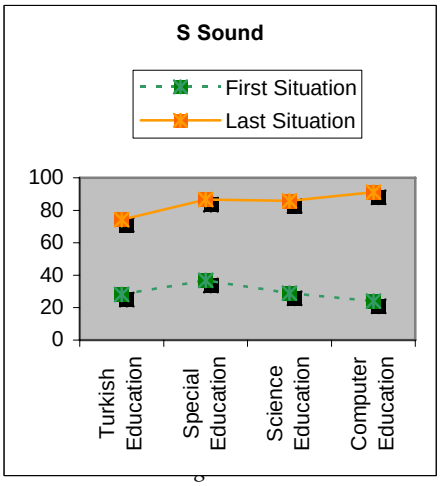

Figure 4

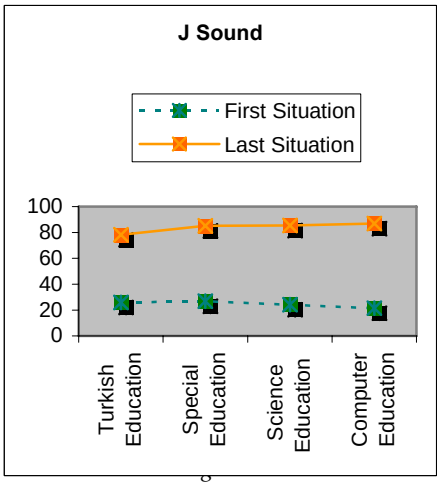

Figure 5

Figure 4. Change in the quality of the "c" sound for the student coded N as determined by the evaluation group.

Figure 5. Change in the quality of the "ç" sound for the student coded N as determined by the evaluation group.

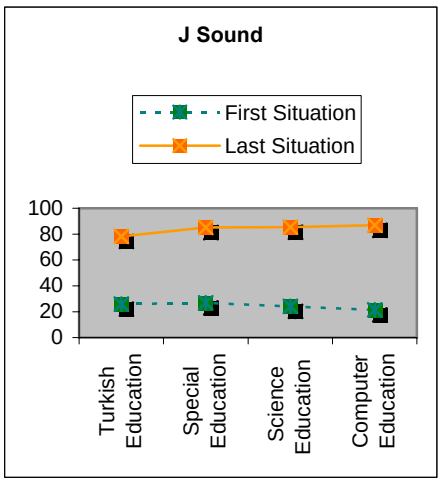

Figure 6

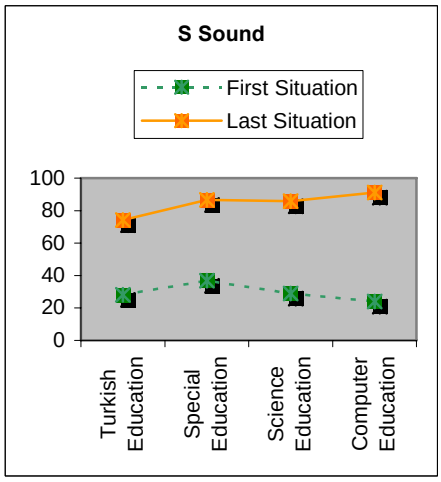

Figure 7

Figure 6. Change in the quality of the "j" sound for the student coded N as determined by the evaluation group.

Figure 7. Change in the quality of the "s" sound for the student coded N as determined by the evaluation groups.

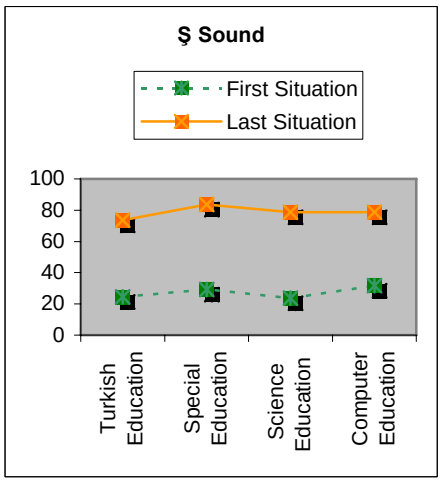

Figure 8

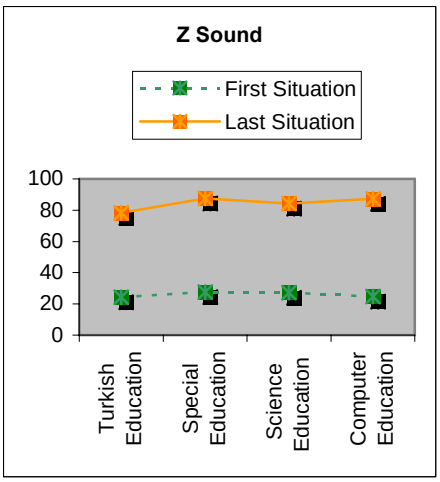

Figure 9

Figure 8. Change in the quality of the "ş" sound for the student coded N as determined by the evaluation group.

Figure 9. Change in the quality of the "z" sound for the student coded N as determined by the evaluation group.

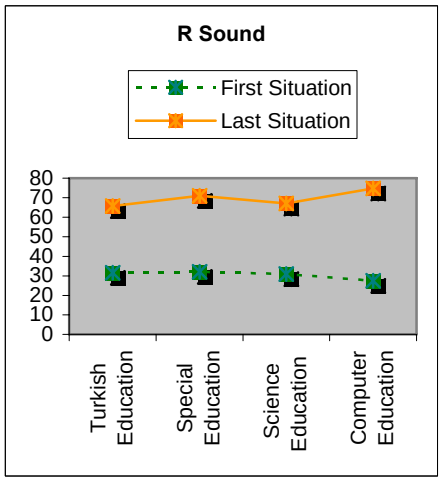

Figure 10

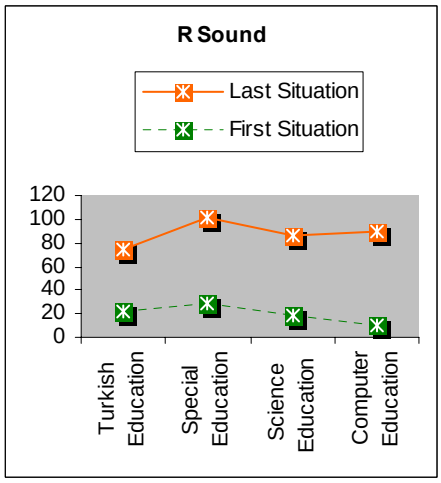

Figure 11

Figure 10. Change in the quality of the "r" sound for the student coded Y as determined by the evaluation group.

Figure 11. Change in the quality of the "r" sound for the student coded Z as determined by the evaluation group.

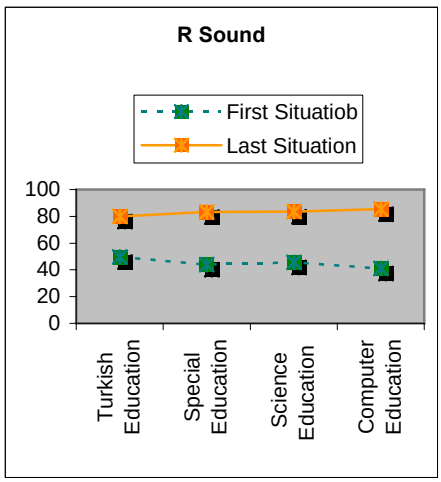

Figure 12

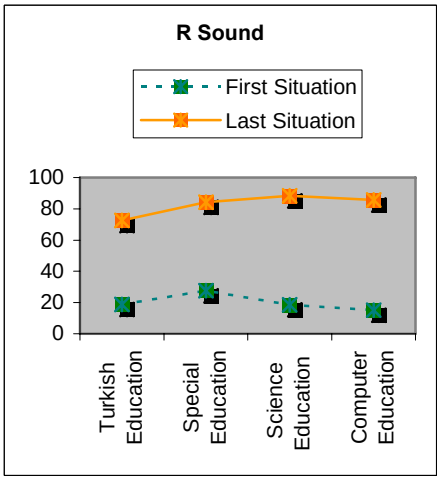

Figure 13

Figure 12. Change in the quality of the "r" sound for the student coded T as determined by the evaluation group.

Figure 13. Change in the quality of the "r" sound for the student coded U as determined by the evaluation group.

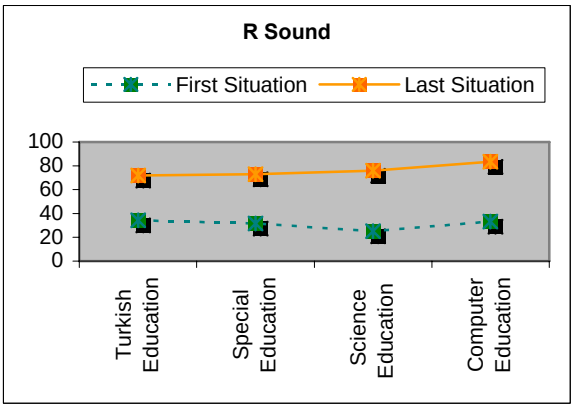

Figure 14. Change in the quality of the "r" sound for the student coded V as determined by the evaluation groups.

Figures 4 through 14 compare the sound quality from the students with articulation disorders coded N, Y, Z, T, U, and V before and after using the computer

aided material. The evaluators watched the audio-visual recordings of the participating students. The recordings were prepared in order to show the initial and final situation for each student. The evaluators determined the level of change in each student's enunciation by watching the recordings that were taken before, in the middle, and at the end of the study. The study showed that the effects from the students' articulation disorders were significantly decreased after using the computer supported material. Arithmetic values were calculated for the 6 students coded N, Y, Z, T, U, and V out of 178 participating students. The progress of the student coded as N is showed in Figure 15.

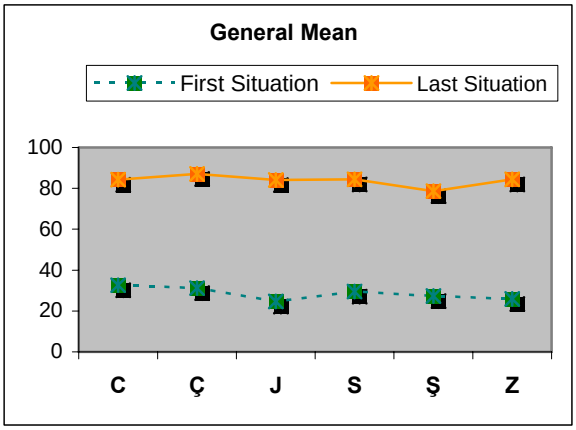

Figure 15. Change in the quality of the "c/ç/j/s/ş/z" sound by the student coded N as determined by all evaluators.

The progress of the student coded as N is indicated by the increase from 32.64 points to 84.19 points for the quality of the 'c' sound, 31.19 to 87.09 for the quality of the 'ç' sound, 24.60 to 84.20 for the quality of the 'j' sound, 29.49 to 84.46 for the quality of the 's' sound, 27.26 to 78.66 for the quality of the 'ş' sound, and 25.96 to 84.42 for the quality of the 'z' sound.

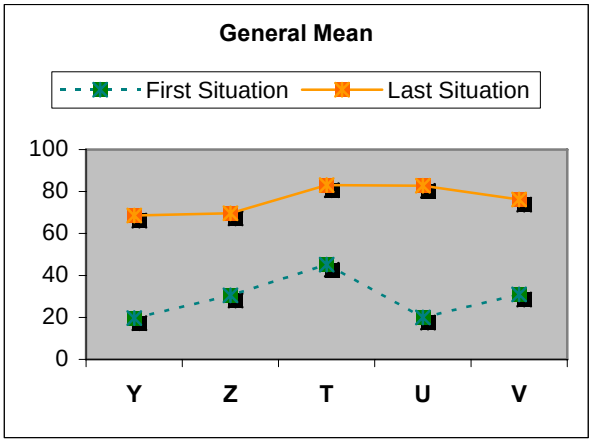

Figure 16. Change in the quality of the "r" sound for the students coded as Y, Z, T, U, and V as determined by all evaluators.

Similarly, progress of the student coded as Y is indicated by the increase in the quality of the 'r' sound from 19.68 to 68.52; the student coded as Z increased the quality of the sound 'r' as indicated by the increase in the average score from 30.50 to 69.68; the progress of the student coded as T is indicated by the increase in the average score for the quality of the 'r' sound from 45.12 to 83.05; the student coded as U increase the quality of the 'r' sound as indicated by the increased average score from 20.01 to 82.74; and the progress of the student coded as V is indicated by the increase in the average score for the quality of the 'r' sound from 30.97 to 76.15. These values represent the arithmetical means of the scores from the 178 evaluators. The arithmetic values are similar for academicians and prospective teachers from similar discipline groups, like Turkish Language Education, Special Education, Science Education, and Computer Education

Speaking education specialists agreed that the students markedly increased their ability to speak the sound correctly. Turkish language education specialists determined that the fluency of the students was a problem because of the struggle to articulate correctly; however, after 12 weeks, these problems decreased to a great extent. Educational science specialists specified that the success that was afforded to the students by the material created self confidence for the students, and a considerable increase in the students' motivation was observed. Speaking specialists also indicated that the use of the material decreased the students' problems. Recordings taken during the 36th week especially demonstrate this success. The student coded as N (23 years old) experienced communication problems with her friends and other people. She said that sometimes she repeated some words many times and that her friends did not understand what she was saying when she used words that included the sounds of c/ ç/ j/ s/ ş/ z. At the end of the study, this same student said that she had corrected all of her problems and that she no longer

encountered difficulties in her interviews for job applications. She emphasized that treating her articulation disorder gave her the self confidence to apply for a job. The student's attitudes and ideas before and after the study were recorded and reviewed by the evaluators. In addition, the views of parents of students N, Y, Z, T, U, and V were collected to determine the effects of the material on each student. Two close friends and a sister of Student N were interviewed to take their views about student N's progression. They all mentioned that N made a great progress. One of Student N's friend stressed that "a great change occured in N's speaking". In addition, student N's sister pointed out that "N became an individual who speaks Turkish clearly".

Similarly, close friends of Student Y, Z, V stressed that their friends' problem with "r" has been considerably removed and people do not even realize their problems with "r" any more. Student T's elder sister mentioned that "at the end of the study T has made a great progress and can pronounce letter "r" without any problem. Student U's mother also mentioned that "U had pronounced the letter "r" as letter "y" before the study, but at the end of the study U's problem with letter "r" has completely removed".

Conclusions and Recommendations

In this study, material was developed to address articulation disorders within the Turkish language, and the effectiveness of the material was investigated. Currently, no academic unit for speaking education has been established in Turkey. The number of specialists, such as speaking therapists, speaking specialists, and language teachers is also limited in Turkey. This limitation makes obtaining language therapy services difficult. People with speaking problems generally are referred to a medical doctor for a treatment. However, if the problem is not treated, some ambiguity regarding their condition remains. Generally, individuals with speaking problems have no clear idea regarding what to do to address their problems. The doctor is seen as the first solution, but when forced to seek the second and the third solutions, individuals encounter some limitations. The relevant literature shows that these problems are treated by specialist staff who commonly use computer aided materials. Computer aided materials provide many opportunities to make abstract concepts more concrete and to provide unlimited interactive exercises and therapy time. In this study, computer aided articulation material for Turkish education was developed, and its effectiveness for treating 6 students was evaluated. This material will contribute positively to studies within this field. A two-dimensional head model was designed, and visual information was offered to users regarding how to vocalize sounds in the Turkish alphabet. Visual elements supported the audio elements in the developed model.

In this study, the effectiveness of the material was evaluated. The material was tested through a case study method over a 36 week period with 6 participating students who have articulation disorders. Positive change in the students' speaking ability was observed by 1 speaking therapist, 15 academicians, and 162 prospective teachers. The effects of the students' articulation disorders decreased without the

benefit of any additional treatment. The findings of the study, including observations obtained from the students, the parents of the students, and the evaluators, showed that the computer aided material created a possible solution for articulation disorders. Additionally, the use of the computer aided material had positive effects on the participating social, psychological, and academic lives of the students. Ultimately, positive results were obtained for the computer aided articulation material that was developed for Turkish language. Further development of similar materials and its common usage may possibly decrease the problems that people have with articulation disorders in Turkey. The mentioned material is currently undergoing the process of further development. In fact, researchers are working on a three-dimensional model. Therefore, future studies will focus on developing three-dimensional material for articulation disorders within the Turkish language. A three-dimensional model will provide a better chance for people who have articulation disorders to see the movements of the teeth, chin, and lip from every angle.

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Artikülasyon Eğitimi İçin Geliştirilen Bilgisayar Destekli Öğrenme Materyalinin Değerlendirilmesi

Özet

Problem Durumu: Türkiye'de konuşma eğitimi alanında uzman yetiştiren akademik birimlerin sayısı oldukça sınırlıdır. Uluslararası literatür incelendiğinde konuşma eğitimi alanındaki çalışmaların uzmanlaşmış kadrolarla yürütüldüğü; bununla birlikte yaygın bir şekilde bilgisayar destekli eğitim prosedürlerinden yararlanıldığı görülmektedir. Diğer dillerden farklı olarak kendine özgü yapısı olan Türkçe için geliştirilmiş bilgisayar destekli artikülasyon materyali bulunmamaktadır. Yapılan araştırmalar; Türkçenin gelişip zenginleşmesi için çalışan tüm kurumlar ve bireyler tarafından sesbilgisi, sesbilim, dilbilgisi, dilbilim, anlambilim gibi birçok alanda özenli ve verimli çalışmalar yürütüldüğünü ve bu alanda

başvurulabilecek özgün yapıtların ortaya koyulduğunu göstermiştir. Ancak Türkçe için konuşma eğitimi alanında kullanıma sunulmuş söz konusu sistemleri temel alan herhangi bir çalışmaya rastlanmamıştır. Bu çalışmada buradan yola çıkılmış ve artikülasyon eğitimine yönelik bir öğretim materyali geliştirilmiştir. Sunulan çalışmada geliştirilen materyalin artikülasyon problemlerinin iyileştirilmesine/düzeltilmesine yönelik başarı oranı araştırılmıştır.

Araştırmanın Amacı: Çalışmanın problemine bağlı olarak geliştirilen bilgisayar destekli materyalin farklı artikülasyon problemlerine sahip bireylerin artikülasyon problemlerini çözmedeki etkiliğini nicel ve nitel olarak ortaya koymaktır. Bunun yanında geliştirilen materyal kullanılarak artikülasyon problemlerinin iyileştirilmesi/düzeltilmesi durumunda sosyal ve psikolojik yönden yaşanan değişimleri incelemek amaçlanmıştır.

Yöntem: Materyal artikülasyon problemlerine sahip 6 (kod adları sırasıyla N, Y, Z, T, U, V) öğrenci üzerinde 36 haftalık bir süreçte yürütülen özel durum çalışmalarıyla test edilmiştir. Öğrencilerin problemlerine yönelik geçmiş yaşantılarını belirlemek amacıyla kendilerine ve ebeveynlerine uygulanmak üzere anket çalışmaları yürütülmüştür. Bunun yanı sıra çalışmanın amacı doğrultusunda artikülasyon problemlerinin düzeltilmesine yönelik geliştirilen bilgisayar destekli materyalin etkisini derinlemesine gözleyebilmek için öğrenciler 12 hafta boyunca haftalık seanslarda takip edilmiştir. 12 haftalık çalışma sürecinin ardından öğrencilerin geldikleri başarı seviyelerini koruyabilme derecelerini belirlemek amacıyla 24 ve 36 haftalık izleme çalışmaları yürütülmüştür. Bu süreçlerde tüm deneyimler kayıt (video görüntüleri) altına alınmıştır. Öğrencilerin problemlerine yönelik belirlenmiş kelime ve cümlelerden oluşan, görsel-işitsel veriler içeren kayıtlar bir konuşma terapisti, bir Türkçe Eğitimi, bir Özel Eğitim, üç Eğitim Bilimleri, üç Fen Bilimleri, iki Matematik Eğitimi, beş Bilgisayar Eğitimi olmak üzere on beş akademisyen tarafından izlendi. Benzer şekilde bu kayıtlar on sekiz Türkçe Eğitimi, altmış bir Özel Eğitim, kırk iki Rehberlik ve Psikolojik Danışmanlık, kırk bir Bilgisayar ve Öğretim Teknolojileri Öğretmenliği olmak üzere toplam 162 lisans öğrencisine izletildi. Değerlendirmeciler kayıtları izleyerek/dinleyerek kendi algıları doğrultusunda problem yaşanan sesin kalitesindeki değişimi kendilerine dağıtılan gözlem formlarına (0′ dan (zayıf) 100′e (çok kaliteli)) belirtmişlerdir. Her bir öğrenci için özel düzenlenen gözlem formları çalışma süreci boyunca öğrencilere okutulan kelime ve cümleleri içermektedir. Değerlendirmeciler kayıtları izlerken aynı zamanda sunulan gözlem formlarından akışı takip edebilmişlerdir. Gözlem formları değerlendirmecilerin bulunduğu akademik birimler temel alınarak ayrı ayrı analiz edilmiş, ortalamalar alınmış ve grafiksel dökümler çıkarılarak veriler yorumlanmıştır. Ayrıca, akademisyenler ve konuşma terapisti için iki farklı oturum düzenlenmiş ve yapılandırılmamış mülakat

yöntemi ile görüşleri alınmış, materyalin başarısı derinlemesine tartışılmıştır. Bir diğer veri kaynağı da çalışmanın örneklemini oluşturan öğrencilerle yürütülen mülakatlardır. Öğrencilerden çalışma süreci sonunda kendilerini değerlendirmeleri istenmiştir. Bu farklı kaynaklardan elde edilen veriler üçgenleme (triangulation) yöntemiyle karşılaştırılarak yorumlanmıştır.

Bulgular ve Sonuçlar: Yapılan tüm çalışmalar göstermiştir ki, öğrenciler materyali kullanarak problemlerinin üstesinden gelme yolunda önemli adımlar atmıştır. Toplam 178 değerlendirmecinin N, Y, Z, T, U, V olarak isimlendirilen öğrencilerin sahip oldukları artikülasyon problemlerinin düzeltilmesine yönelik algısal oranlamalarının ortalama değerleri saptanmıştır. N olarak isimlendirilen öğrencinin "c" sesindeki başarısı 32,64' den 84,19' a, "ç" sesindeki başarısı 31,19' dan 87,09' a, "j" sesindeki başarısı 24, 60' dan 84,20' e, "s" sesindeki başarısı 29,49' dan 84,46' a, "ş" sesindeki başarısı 27,26' dan 78,66' a, "z" sesindeki başarısı 25,96' dan 84,42' e ulaşmıştır. Benzer şekilde Y olarak isimlendirilen öğrencinin "r" sesindeki başarısı 19,68' den 68,52' e, Z olarak isimlendirilen öğrencinin "r" sesindeki başarısı 30,50' den 69,68' e, T olarak isimlendirilen öğrencinin "r" sesindeki başarısı 45,12' den 83, 05' e, U olarak isimlendirilen öğrencinin "r" sesindeki başarısı 20,01' den 82, 74' e ve V olarak isimlendirilen öğrencinin "r" sesindeki başarısı 30,97' den 76,15' e ulaşmıştır. Böylece 1 konuşma terapisti olmak üzere toplam 178 değerlendirmeciden, öğrencilerin kendilerinden ve yakın çevrelerinden elde edilen veriler; bilgisayar destekli materyaller kullanılarak artikülasyon problemlerinin iyileştirilebileceğini/düzeltilebileceğini, geliştirilen materyalin N, Y, Z, T, U, V olarak isimlendirilen öğrencilerin problemlerine çözüm getirdiğini ve bu durumun öğrencilerin sosyal, psikolojik ve akademik yaşantıları üzerinde olumlu etkiler bıraktığını göstermiştir.

Öneriler: Yürütülen çalışmanın kapsamı içerisinde artikülasyon eğitimine yönelik geliştirilen materyalin etkinliği tespit edilmiştir. Böylece bu alanda uluslar arası normların yakalanması doğrultusunda çalışmalar yoğunlaştırılmalıdır. Materyal, konuşma seslerinin artiküle edilmesi sırasında etkili olan dil, diş, çene, damak ve dudakların her açıdan görülebilmesine olanak verecek şekilde üç boyutlu ortama taşınmalıdır. Türkçe'nin etkili, güzel, kurallara uygun ve dünya dilleri arasında sahip olduğu akıcılığa uyularak konuşulmasını desteklemek üzere materyale yeni boyutlar kazandırılmalıdır. Materyal, Türkçe konuşma seslerini ve rakamları örnekleyecek biçimde tasarlanmıştır. Bunların yanı sıra materyale, bir sessiz ve bir sesliden oluşan heceleri ve özellikle Türkçe'de sıklıkla problem yaşanan ve yazı dilinden ayrı düşen inceliklerin vurgulandığı kelimeleri içine alan hece ve kelime listeleri kazandırılmalıdır. Farklı yaş gruplarında bulunan kullanıcılar için farklı ara yüzler tasarlanmalıdır. Konuşma sesleri ile birlikte kullanıcıların

ilgisini çekecek yazılar veya resimler sunulmalıdır. Yaş aralığı azaldıkça görsellik ön plana çıkarılmalı ve mönüler arası geçişler kolaylaştırılmalıdır.

Günümüzde bilgiye daha hızlı ve kolay erişimin yolları aranmaktadır. Bu doğrultuda mobil aygıtlar dikkatleri üzerlerine toplamaktadırlar. Mobil aygıtlarla zamandan ve mekândan tamamen bağımsız, öğrencinin bireysel öğrenmesine olanak veren esnek öğrenme ortamları oluşturmak mümkündür ve bu çalışmada kullanılan materyalin mobil aygıtlara adapte edilmesi ve kullanılabilirliğinin araştırılması parlak bir fikir olarak görülmektedir.

Anahtar Sözcükler: Türkçe, Artikülâsyon Problemleri, Bilgisayar Destekli Öğrenme Materyali

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Effectiveness of Various Oral Feedback Techniques in CALL Vocabulary Learning Materials*

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Abstract

Problem Statement: When using Computer Assisted Language Learning (CALL) materials for individual study, it is crucial for learners to be able to monitor and evaluate their own learning processes. The feedback provided by these materials plays an important role in supplying this relevant information to the learner. However, results of previous studies are inconsistent, especially in considering if providing the correct response is beneficial or counterproductive. Some studies argue that, for verbal information, providing the correct response could be effective as it adds information to the mental structures of the learner.

Purpose of Study: The current study investigates the effects of different combinations of verbal oral feedback in CALL vocabulary materials. Although new materials enhanced with artificial intelligence and simulations are being developed, the focus here is on traditional CALL materials. There are two main reasons for this. Primarily, these are affordable self-study materials used to increase and reinforce meaning and pronunciation of foreign language vocabulary. These materials, which feature game-like activities, specifically suit primary school learners with limited targets for learning. Additionally, most schools in Turkey already possess such materials. However, the approach to feedback in these materials is inconsistent and deserves more attention.

Methods: A pre-test, post-test experimental design was used to analyse the effects of different types of oral feedback techniques on the number of words recalled. The study group consisted of sixth and seventh grade students from different schools in Istanbul, Turkey. Study materials only differed in their approach to feedback in the practice stage.

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Findings and Results: The study tested various conditions which differed in oral feedback used in the materials. Results indicate that explanatory feedback is more effective than confirmation feedback. However, findings also suggest that confirmation feedback could be equally effective when other feedback variables, such as trial number and repeating each question, are manipulated. In contrast to what the literature has suggested, this study demonstrated a surprising result: written feedback did not increase the effectiveness of verbal oral feedback. An animation technique, using a flashing animation was found to be more influential than written feedback in strengthening attention, perception, and word association.
Conclusions and Recommendations: The best practices for using oral feedback in CALL vocabulary materials include paying attention to the amount of time allocated after the oral feedback of a correct response, using animation to enhance the effectiveness of a correct response and the effects of repetition, number of trials and audio-visual cues.
Keywords: Oral feedback, feedback types, feedback techniques, vocabulary, CALL

Various inexpensive CALL materials are based primarily upon behaviouristic principles. Although new materials, technologies and approaches such as Computer Mediated Communication (Özdener & Satar, 2008; Satar & Özdener, 2008) are becoming increasingly popular, traditional materials continue to offer good practice, especially for elementary level students and those in need of extra practice. It would be unwise to disregard these materials. However, it is suprising to find that these traditional materials have not been thoroughly studied. Previous studies do not provide sufficient information to guide designers and developers. At first glance these studies appear identical, but closer inspection reveals random differences in the design of the activities and the feedback provided. This suggests that the software developing team relied on their intuitions during design and development, rather than on sound knowledge gained through research, without an awareness of the impact of the different design features.

One reason why these materials are effective is that they provide the learner with immediate feedback, enabling one to monitor and evaluate one's own learning process. Skinner (1958) defined feedback as any information that follows a response and allows a learner to evaluate the efficiency of the response itself. This initial definition of feedback remains valid for individual language learning materials with regard to the two aspects emphasized: feedback provides information on the response and allows for evaluation of the response. Feedback not only empowers students with more control and information, but it may also be a crucial element in the effectiveness of instruction, based on the kind of strategy used and on the quality of the information provided.

Varying perspectives on learning bring about different perspectives on feedback. For behaviourists, "knowledge-of-correct-response serves as a reinforcer of appropriate behaviours"; for cognitivists, "information about results helps to enrich the learner's mental schema"; and for social psychologists, "feedback supports

students emotionally and provides them with corrective information" (Heinich, Molenda, Russell, & Smaldino, 1996).

In the wide range of CALL materials, some focus solely on teaching vocabulary while others provide short exercises in the normal sequence of the storyboard. There are also a number of studies on the use of feedback in the field of educational technology that seem to provide extensive guidance (Alessi & Trollip, 2001; Larkin & Chabay, 1992). However, these are rather broad and do not comment on the specific needs of each field. Various possibilities exist in providing feedback and as many decisions to be made. These include type of feedback, timing of feedback, number of trials allowed and the feedback channel (audio, written, visual) etc., all of which depend on the kind of information under study and the qualities of the task at hand.

Some studies, such as Beutner (2001), suggest that feedback works best "when the knowledge of results is informative and when the learner knows or is told what to do to correct his or her errors" (p. 45). Another important factor on the effectiveness of feedback is the learners' response confidence (Kulhavy & Stock, 1989). The effects of feedback also depend on the channel in which it is provided. In his 1992 study, Bationo concluded that feedback is most effective for learning when written and spoken feedback are combined. Other studies emphasized the quality of feedback suggesting it should be motivating and constructive (Bang, 2003) and it "should encourage the learner to improve thinking and comprehension" (Alessi & Trollip, 2001, p.113). Effective feedback is not "a replacement for thinking" but it "may help to bring difficult material within the cognitive reach of some students, enabling them to learn." (Schimmel, 1988, p.193)

Schimmel (1988) described the types of feedback as follows:

- Confirmation feedback: knowledge of whether the answer was right or wrong. "Yes", "Good Job", "No", and "Try Again" are all examples of this kind of feedback.

- Correct Response Feedback: the knowledge of the correct answer to a question, which can be combined with confirmation feedback. Correct response feedback can be provided either after incorrect responses or after both correct and incorrect responses.

- Explanatory Feedback: the knowledge of "a step-by-step solution to an incorrectly answered problem … with the exception of the final step." This guides the learner to the correct response without providing the solution.

- Bug related feedback: the knowledge of the "systematic error in the learner's understanding of a procedure." For example, if a student is to multiply 4 and 2 and s/he replies 6, then the feedback should say "No. You've added 4 and 2. You should multiply them." This kind of feedback tries to spot the student's systematic errors and to correct their faulty mental schema.

After defining the types of feedback, Schimmel (1988) provided some principles for designing feedback. He stated that, in verbal information tasks, correct response feedback should be used. However, in his review of eleven studies, he concluded that the studies do not present sufficient information to differentiate the effects of

confirmation and correct response feedback. He also concluded that other types of feedback in verbal information instruction have not been consistently studied.

Epstein (1997) also recommended the use of feedback in verbal information, stating "different tasks call for different kinds of feedback" (p.16). He suggested that knowledge of correct response might be the most effective feedback for learning verbal information because the learner is adding information to mental structures stored in the memory. Epstein (1997) also concluded that "feedback, when applied to learning verbal analogies is most effective when it provides knowledge of results plus additional instruction." (p. 17). He also cited Whyte, M. M., Karolick, D. M., Neilsen, M. C., Elder, G. D. and Hawley, W. T. (1995): "Cognitive psychologists embrace the belief that some feedback does reinforce but informational feedback primarily serves to help students locate errors and provides information to help learners correct their errors."

Other studies support the theory that providing the correct response in feedback without cognitive effort by the learner can be counterproductive (Melis & Andrès, 2005). These researchers stated that learners might only use the information provided by correct responses to judge their performance (in competition) rather than to reason about mistakes and correct errors.

The feedback strategies used in the available CALL materials differ, as do the results of studies examining different forms of feedback (Epstein, 1997). As Schimmel (1988) pointed out in late 1980s, "Despite its wide use, however, the optimal content of feedback is still in question." (p. 183). This statement still holds true today.

CALL software programmes offer vast opportunities to enhance the effectiveness of foreign language learning, especially for the learning of vocabulary. CALL and the multimedia environments are therefore important tools to help learners improve their vocabulary skills (Druin & Hendler, 2000; Duquette, Renie & Laurier, 1998). Banafa (2004, p.42) reported that "many studies have discussed the benefits of multimedia CD-ROMS and computerized media on learning foreign language vocabulary." However, despite their best efforts, reserchers were unsuccessful in finding previous literature on the use of oral feedback in CALL materials for vocabulary teaching.

Purpose of Study

The purpose of this study is to explore the effects of different combinations of oral feedback types in CALL vocabulary teaching materials. The following were hypothesized for oral feedback design in foreign language vocabulary activities in CALL materials:

1. Explanatory feedback is more effective than confirmation feedback.

2. Explanatory feedback is more effective when it is used in conjunction with correct response feedback than when it is used alone.

3. When confirmation feedback is used, in order to create maximum word retention, it is better to repeat the question after each incorrect response

4. Confirmation feedback is more effective than explanatory feedback if the student has the chance to answer until correct and the question is repeated after every attempt.

5. Using the written word in feedback enhances the retention of the item.

6. Using the written word both in the practice and presentation of vocabulary items enhances retention of the item.

7. Using animation techniques for better reception and perception enhances the effectiveness of the correct response.

Method

Research Design

The study was conducted in two phases; the first five hypotheses were tested during the first phase. Upon reflection on the results from the first phase, the final two hypotheses were tested during the second phase.

The research used a post-test experimental design for both phases. The first phase examined the effects of seven oral feedback techniques (independent variables) on the number of items retained (dependent variable). The second phase examined the dependent variable and the effects of four oral feedback techniques (independent variables).

Sample

Two hundred and nineteen sixth and seventh grade students participated in the first phase of the study. They were randomly assigned to seven treatment groups. The second phase of the study was conducted with four additional treatment groups composed of 101 students.

Procedures

For the selection of the vocabulary items, a paper and pencil test was administered before the experiment; 35 words were presented and the students were requested to provide their native language equivalents of the words that they knew. There were two aims in using 35 questions on the pre-test: first, to choose 20 items which none of the students knew and second, to prevent the backwash effect of the test so that all seven groups would be equivalent at the time of the experiment. Of the 20 items selected after the test, 18 were unknown to all of the students. The two remaining items, of which the students had partial knowledge, were added by the researchers intentionally to enhance motivation. The last section of the programme, in which all twenty items were tested, functioned as the post-test. The results were displayed on screen. The study was carried out in computer laboratories by one group at a time during computer lessons.

Research Instruments

After a thorough search and analysis of available foreign language vocabulary teaching materials, they were discarded in cross-comparison for their different feedback types because they also differed in other aspects, such as the trial numbers and activity characteristics (game-like or not). As a result, designing and developing new materials was necessary in order to control variables other than the independent variables. The materials were created using Visual Basic 6.0, and they differed only in the feedback in the exercises (except for the 8th material designed for the second phase). Table 1 summarizes the oral feedback types used in the study.

Table 1

Different Modes of Feedback (Independent Variables) Used in the Materials

Material no.	Feedback Type	Trial Number	Repetition of Question	Written / Spoken
Phase One				
1	Confirmation	2	no	Spoken
2	Explanatory	2	no	Spoken
3	Explanatory + Correct response	2	no	Spoken
4	Confirmation	answer until correct	no	Spoken
5	Confirmation	answer until correct	yes	Spoken
6	Explanatory	answer until correct	yes	Spoken
7	Explanatory + Correct response	2	no	Spoken + Written
Phase Two				
8	Explanatory + Correct response	2	no	Spoken + Written Presentation + Practice
9	Explanatory + Correct response	2	no	Spoken supported with animation (flashing)

Several issues should be clarified regarding materials design. First, the materials were not designed for teaching purposes nor were they used as teaching materials as

part of a language teaching course. The sole aim was to reveal the effects of different oral feedback types successfully. Second, for the design of the materials, 20 words were chosen for practical considerations during data collection; if more words were used, the attention span of the students could have interfered the findings. Third, all of the vocabulary items were concrete nouns because (1) abstract nouns would be difficult to illustrate using pictures and, thus, could lead to misunderstandings; and (2) concrete nouns are easy to learn and use at initial language learning stages.

The approach used in the materials was behaviouristic so that the study could emphasize the lack of research concerning CALL materials, even in those areas that are believed to be already fully exploited. Although communicative approaches could guide the design of CALL materials, behaviouristic principles that guide these easy to develop, motivational, and effective materials should not be discarded. They could be effectively incorporated into more communicative teaching or be used as supplementary materials, if not as the primary material. For instance, behaviouristic approaches could be used as self-study tools or at the initial stages of introducing vocabulary. In this way, the materials could complement other activities. Concept maps are one such activity and can be used to enrich word meaning and usage (Acat, 2008). As self-study tools, CALL materials offer valuable practice to many learners. However, as the literature review suggests, a detailed examination of design features to enhance learning is needed.

From the different feedback types (Schimmel, 1988), bug related feedback was not used in this study because it is more appropriate in areas such as mathematics, which require logical operations and higher-order thinking. Contrarily, learning foreign language vocabulary items presented out of context does not need such a process. From the different feedback types (Schimmel, 1988), explanatory feedback was utilized in a simple fashion (the explanation for the wrong response was the relavent word for the vocabulary item in question). The explanation did not provide guiding clues, such as "Apple is a fruit, not a vegetable" because (1) the students were at an elementary level, and some students would not understand the explanation; (2) if clues were used (by using 4-5 words from the same category) more vocabulary items would also be needed, or the feedback would be the same for 4-5 vocabulary items; and (3) if more vocabulary items were used for more qualified explanatory feedback, then the administration of the study would take longer, which would negatively affect the motivation and attention of the students.

The programmes started with a presentation where the students had the chance to listen and to see the vocabulary items. All of the 20 words were displayed on one screen, and the students clicked on each item to hear the pronunciation (Figure 1).

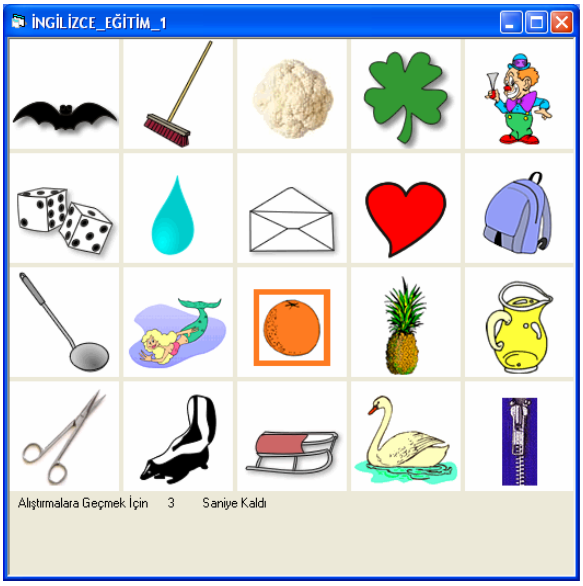

Figure 1. Screen shot of the presentation

This section lasted for a fixed period of 310 seconds (which was pre-determined from the results and the experiences of the pilot study). This stage was same in all the materials except for the 8th as a requirement for the 6th hypothesis (the screen in the presentation stage of the 8th material is presented with the screen of the practice stage in Appendix 1). Following this, the second window was displayed for practicing the items. For each question, six pictures were presented on the screen and the students had to click on the corresponding picture. This section lasted for a fixed period of 300 seconds. In this section, the students received the aforementioned feedback types. In Appendix 1, screen-shots from the practice stage of the materials are presented, and the oral feedback for each material is explained. After the practice stage, the students were guided to the third window, which tested the recall of the vocabulary items and displayed the score (Figure 2). This section was also same in all materials.

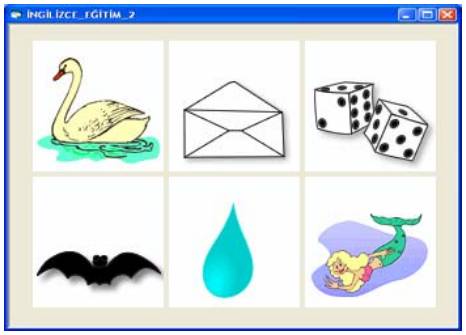

Figure 2. Test screen for the materials

Findings and Results

The results were analyzed using parametric statistics. Independent t-tests were performed between each two groups to be compared.

Hypothesis #1

Explanatory feedback is more effective than confirmation feedback. A statistically significant difference was observed between post-test results of groups 1 and 2 in favour of explanatory feedback (p=0,00<,05) (Table 2).

Table 2

Post-Test Results of Groups 1 and 2 Analyzed by Independent Samples T-Test

	N	X	S	Sd	t	p
Material-1	32	11,93	2,60	62	5,37	0,00
Material-2	32	15,31	2,41			

Hypothesis #2

Explanatory feedback is more effective when it is used together with correct response feedback than when it is used alone. The second hypothesis was rejected as illustrated in Table 3. Although there was a slight difference of 0,56 in the mean scores in favour of explanatory feedback with the correct response, t-test results showed no statistically significant difference (p=0,51>,05).

Table 3

Post-Test Results of Groups 2 and 3 Analyzed by Independent Samples T-Test

	N	X	S	Sd	t	p
Material-2	32	15,31	2,42	61	0,67	0,51
Material-3	31	15,87	4,02			

Hypothesis #3

When confirmation feedback is used, in order to create maximum word retention, it is better to repeat the question after each incorrect response. Independent t-test results for groups 4 and 5 are presented in Table 4. These results indicate that there was a significant difference (p=0,01<,05) between the two groups in favour of repeating the question each time.

Table 4

Post-Test Results of Groups 4 and 5 Analyzed by Independent Samples T-Test

	N	X	S	Sd	t	p
Material-4	32	13,22	2,99	62	2,68	0,01
Material-5	32	15,41	3,51			

Hypothesis #4

Confirmation feedback is more effective than explanatory feedback if the student has the chance to answer until correct and the question is repeated after every attempt. As shown in Table 5, the hypothesis was rejected and no significant difference was found between the two groups (p=0,18>,05).

Table 5

Post-Test Results of Groups 5 and 6 Analyzed by Independent Samples T-Test

	N	X	S	Sd	t	P
Material-5	32	15,41	3,51	60	1,47	0,18
Material-6	30	15,60	2,82			

Hypothesis #5

Using the written word in feedback enhances the retention of the word. Independent t-test results for groups 3 and 7 are presented in Table 6. This hypothesis was rejected because the test scores showed no statistically significant difference (p=0,84>,05).

Table 6

Post-Test Results of Groups 3 and 7 Analyzed by Independent Samples T-Test

	N	X	S	Sd	t	p
Material-3	31	15,87	4,02	59	2,68	0,84
Material-7	30	15,70	2,29			

Hypothesis #6

Using the written word both in the practice and presentation of the vocabulary items enhances the retention of the word.

Table 7

Post-Test Results of Groups 7 and 8 (Second Phase) Analyzed by Independent Samples T-Test

	N	X	S	Sd	t	p
Material-7	20	13,30	3,33	39	1,23	0,22
Material-8	21	14,67	3,75			

Table 7 shows the independent samples t-test results for groups 7 and 8. The hypothesis was rejected as the test scores showed no statistically significant difference (p=0,22>,05).

Hypothesis #7

Using animation techniques for better reception and perception enhances the effectiveness of the correct response. Table 8 presents independent samples' t-test results for the post-test results of groups 3 and 9. This hypothesis was confirmed (p=0,01<,05), and a significant difference was found between the two groups in favour of the material in which the correct answer was supported with an animation technique (namely flashing).

Table 8

Post-Test Results of Groups 3 and 9 (Second Phase) Analyzed by Independent Samples T-Test

	N	X	S	Sd	t	p
Material-3	30	15,77	1,96	58	2,55	0,01
Material-9	30	17,23	1,04			

Discussion

The results of the study revealed some very important aspects in the use of oral feedback. The first of these results clearly indicated that using explanatory feedback was more effective than using confirmation feedback. This result was anticipated in accordance with the arguments of Alessi and Trollip (2001), Bang (2003) and Schimmel (1988), who argue that feedback should be constructive. As such, constructive feedback may lead to thinking and "bring difficult material within the cognitive reach of some students, enabling them to learn." Explanatory feedback in the material helps students reconstruct their incorrect mental schema by highlighting the error. With explanatory feedback, students have at least two chances to reorganize their schema: first, by learning the correct word instead of their incorrect response; and second, by acknowledging their incorrect answer, which may bring about some kind of meta-cognitive awareness and a desire to learn the correct answer to the question.

The findings also suggested that more effort should be spent in the design of feedback. Although there are conflicting views on providing correct responses, the belief that correct response feedback may be the best type of feedback in verbal information tasks is widely accepted (Epstein, 1997; Schimmel, 1988). For this reason, the hypothesis predicted that explanatory feedback would be more effective with the complement of the correct response. As the results demonstrate the opposite, the materials were re-evaluated in the light of the results to discover possible reasons.

Included in these is the possible ineffectiveness of correct response due to the time period allowed before the material passes on to the next question (2-3 seconds). This short interval may not be enough for the students to think about the correct answer, or they may be more interested in hearing the next question than continuing to think about the current question.

Another reason why the hypothesis was rejected may be the oral nature of the feedback. A combined correct response - explanatory response may not be effective because of the limitations of the short-term memory. Conversely, when a correct response is provided, a mechanism should be added to ascertain that the correct response is acknowledged and perhaps retained by the learner. In future studies, more effective strategies should be incorporated to encourage students to focus on and think about the correct response, enhancing the effectiveness of correct response feedback. For example, students might be required to complete a task before the programme continues to the next question. Also, different visual designs could be considered.

One other finding of the study indicated that it would be inappropriate to claim one feedback type as more effective than another without considering the type of information and the characteristics of the feedback. While in the current study explanatory feedback was found to be far more effective than confirmation feedback (as indicated by the results of the first hypothesis), confirmation feedback could be as effective as explanatory feedback when it is used with the correct combination of feedback characteristics. The results suggested that if confirmation feedback used, students might be allowed to answer until correct, and the question should be repeated each time. This repetition may help students focus on what the word is. The visual data and corresponding sound are associated, and frequent repetition of the question might help transfer the word to long term memory. Likewise, the rapid nature of the exercise might increase motivation, giving the exercise a game-like characteristic.

While repeating the question improved the effectiveness of confirmation feedback, it did not produce the same effect for explanatory feedback. The results of the fourth hypothesis suggested that when the question was repeated each time, the scores were not significantly different between correct and explanatory feedback types, despite the results of the first hypotheses (which were in favour of explanatory feedback). This can be explained by the fact that repetition of the question did not improve the quality of explanatory feedback because students could, perhaps, only pay attention to one of these at a time. Either explanatory feedback helped to correct them or continuous repetition allowed them to find and learn vocabulary. This is consistent with the result of the previous hypothesis; in order for repetition of the question to take effect, no other information should interfere.

One particularly interesting result of the study concerned the effects of written feedback. Bationo (1992) maintained that feedback using the written word in combination with sound is more effective than feedback using one channel only. He also presented other studies which supported his results. Accordingly, one of the materials developed for the current study included written feedback shown as a visual cue to aid word retention. However, the results contradicted the literature. This could be because, in the current study, post-tests were administered on monitors where students clicked on the pictures of the words they heard the sounds for. In contrast, Bationo (1992) used a paper and pen test as the post-test. The written word was not used in any other parts of the material in the present study--neither in

presentation nor test sections--and it is possible to conclude that written feedback is not effective when the material uses only audio input.

After considering the results of the first phase in the study, a second phase was organised. In order to re-test the effectiveness of the written word, an additional material was developed using the written word used in the presentation stage. Researchers predicted that written feedback would be effective if it was also used in other parts of the material. However, this hypothesis was also rejected. Two possible reasons for these contradictory results are suggested: (1) written feedback was not effective because of the oral nature of the material, and (2) written feedback was not effective because of the digital testing technique that was employed. Further studies on the effects of written word, especially for materials which uses only oral stimuli, would be invaluable.

The result of the second hypothesis of the second phase led to the conclusion that the designer may use different techniques in order to overcome the limitations of short-term memory in order to increase the effectiveness of correct response feedback in oral materials. For the second phase of the study, an animation technique (i.e. flashing) was used to encourage students to pay attention to the correct feedback. A red square around the item flashed while the corresponding pronunciation was heard. The results proved the technique to be effective and indicated that oral correct response feedback should be supported by other techniques to strengthen attention, perception, and association.

Conclusion and Recommendations

The study underlines the importance of feedback design, especially for oral materials. Additionally, the study demonstrates that feedback-type is not the sole factor that determines success. Other characteristics, such as the repetition of the prompt, the number of trials and audio-visual cues, may affect success. The study also suggests that visual and theoretical design of the materials should include feedback which attracts attention and which encourages learners to reflect on their answers. The results stress the importance of pursuing the findings of field-specific research on oral feedback as the effects of feedback tend to change in relation to what is being taught and which characteristics are used. Finally, in order to provide a sound basis for research, more detailed investigation of a variety of CALL materials, not only for the highly popular and new technologies but also for the older methodologies is necessary.

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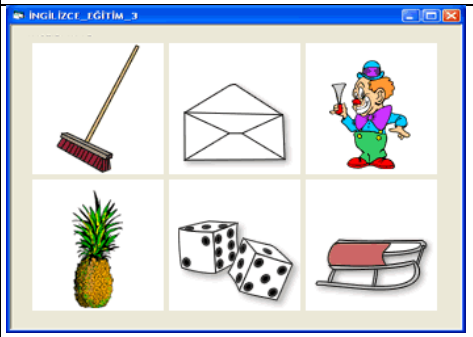
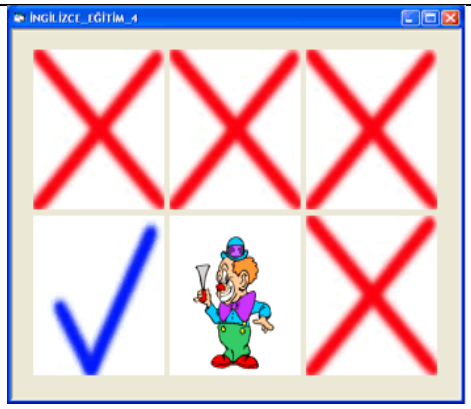
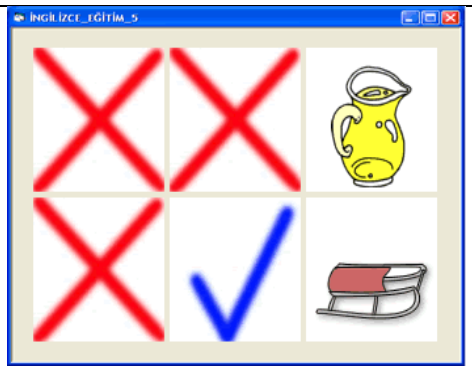
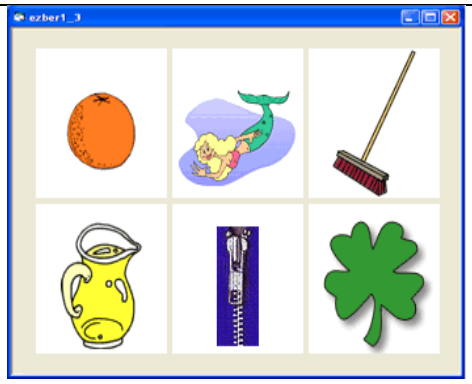
Appendix 1.

Material # 1		The first material provides confirmation feedback and allows for 2 trials. It doesn't repeat the question after each wrong answer. An example of the question-answer-feedback cycle for the student's first attempt is as follows; Question: "Find the mermaid." Answer: The student clicks on *drop*. Feedback: "No."
Material # 2		The second material provides explanatory feedback and allows for 2 trials. It doesn't repeat the question after each wrong answer. An example of the question-answer-feedback cycle is as follows; Question: "Find the clown." Answer: The student clicks on *dice*. Feedback: "No. That's the dice."

Material # 3		The third material provides the correct response with the explanatory feedback and allows for 2 trials. It doesn't repeat the question after each wrong answer. An example of the question-answer-feedback cycle after is as follows; Question: "Find the drop." Answer: The student clicks on *swan*. Feedback: "No. That's the swan." Answer: The student clicks on *dice*. Feedback: "No. That's the dice. This is the drop"
Material # 4		The fourth material only provides confirmation feedback and allows for trials until the correct answer is given. It doesn't repeat the question after each wrong answer. An example of the question-answer-feedback cycle after the student's second attempt is as follows; Question: "Find the drop." Answer: The student clicks on *dice*. Feedback: "No."

Material # 5		The fifth material again provides only confirmation feedback and allows for trials until the correct answer is given. It repeats the question after each wrong answer. An example of the question-answer-feedback cycle after the student's third attempt is as follows; Question: "Find the drop." Answer: The student clicks on *dice*. Feedback: "No. Find the drop."
Material # 6		The sixth material provides explanatory feedback and allows the student to answer until correct. It repeats the question after each wrong answer. An example of the question-answer-feedback cycle after the student's second attempt is as follows; Question: "Find the pitcher." Answer: The student clicks on *mermaid*. Feedback: "No. That's the mermaid. Find the pitcher."

Material # 7		The seventh material again provides the correct response with the explanatory feedback and allows for 2 trials. It doesn't repeat the question after each wrong answer. An example of the question-answer-feedback cycle after the student's second attempt is as follows; Question: "Find the pineapple." Answer: The student clicks on *clown*. Feedback: "No. That's the clown. This is the pineapple." (the written word is also provided.)
Material # 8 (presentation)		When the students click on the words they can both hear and see the word.

Material # 8 (practice)		The eighth material again provides explanatory feedback combined with the correct response and allows for 2 trials. It doesn't repeat the question after each wrong answer. An example of the question-answer-feedback cycle after the student's second attempt is as follows; Question: "Find the drop." Answer: The student clicks on *pitcher*. Feedback: "No. That's the pitcher. This is the drop." (the written word is provided both in the presentation and in practice stages.)

Material # 9		The ninth material again provides explanatory feedback combined with the correct response and allows for 2 trials. It doesn't repeat the question after each wrong answer. An example of the question-answer-feedback cycle after the student's second attempt is as follows; Question: "Find the pineapple." Answer: The student clicks on *clown*. Feedback: "No. That's the clown. This is the pineapple." (The red square around the correct answer flashes with the accompanying correct word.)

Bilgisayar Destekli Dil Öğretiminde Kelime Çalışmaları ve Sözel Geribildirim Kullanım Teknikleri

(Özet)

Problem Durumu: Bilgisayar Destekli Dil Öğretimi (BDDÖ) yazılımlarında öğrencilerin öğrenme süreçlerini izleyip değerlendirebilmeleri oldukça önemlidir. Öğrenciye bu hususta gerekli bilginin sağlanmasında sunulan geribildirim büyük rol oynar. Ancak bu alandaki çalışmalar, özellikle geribildirimde doğru cevabın etkileri konusunda tutarsızlık göstermektedir. Bir kısım çalışma, geribildirimin düşünme, anlama ve diğer zihinsel süreçleri desteklemesinin önemini vurgulamaktadır. Bu çalışmalara göre doğru cevabın sunulması, öğrencinin düşünme çabasını gereksiz kılarak, geribildirimin hatanın düzeltilmesi yerine sadece değerlendirme amacıyla kullanılmasına neden olacaktır. Öte yandan, diğer çalışmalar zihinsel becerilerin öğretimi ile sözel bilgiler arasında bir ayrıma giderek görev türünün önemini vurgulamaktadır. Bu açıdan doğru cevabın sunulması öğrencinin zihinsel şemalarına yeni bilgi eklenmesine yardımcı olacağı için öğrenmede etkili olacaktır.

Araştırmanın Amacı: Bu çalışma BDDÖ materyalleri ile gerçekleştirilen kelime çalışmalarında kullanılan farklı sözel geribildirim türlerinin etkisini araştırmaktadır. Yapay zeka ile desteklenmiş yeni yazılımlar ve simülasyonlar geliştirilmeye devam edilmekle birlikte, bu çalışma geleneksel BDDÖ materyallerini incelemektedir. Bu amacın iki temel nedeni bulunmaktadır. Öncelikle düşük ücretli kendi kendine öğrenme ortamı sağlayan bu yazılımlar, kelimelerin anlam ve telaffuzlarının öğrenilmesi ve pekiştirilmesi olanağı sunmaktadır. Etkinlikleri oyunlar içinde sunan bu yazılımların, özellikle öğrenme hedeflerinin sınırlı olduğu ilköğretim öğrencileri için oldukça yararlı olduğu düşünülmektedir. Ayrıca Türkiye'de birçok okulda benzer çeşitli yazılımlar mevcuttur. Ancak, bu yazılımlarda farklı geribildirim türleri kullanılmakta ve bu türlerin etkileri bilinmemektedir.

Araştırmanın Yöntemi: Çalışma mevcut BDDÖ yazılımlarında kelime çalışmalarında kullanılan farklı sözel geribildirim türlerinin hatırlanan kelime sayısına etkilerini ön-test son-test deneme modeli ile incelemektedir. Çalışma grubunu İstanbul'da farklı okullarda öğrenim görmekte olan 6 ve 7. sınıf öğrencileri oluşturmuştur. Çalışmada kullanılan materyaller sadece kullanılan geribildirim türleri açısından farklılık göstermektedir.

Araştırmanın Bulgular: Çalışmada, sözel geribildirim açısından farklılık gösteren materyallerin özellikleri karşılaştırılmıştır. Sonuçlar açıklayıcı geribildirimin sadece doğru cevabın sunulduğu geribildirime kıyasla daha etkili olduğunu ortaya koymaktadır. Ancak araştırma sonuçları, sadece doğru cevabın sunulduğu geribildirimin de deneme sayısı ve her denemede sorunun tekrar edilmesi gibi çeşitli geribildirim değişkenlerinin farklılaştırılmasıyla açıklayıcı geribildirim kadar etkili olabileceğini ortaya koymuştur. Sonuçlar sözel kelime çalışmalarında yazılı geribildirimin

literatürde vurgulandığı kadar etkili olmadığını ortaya koymaktadır. Çalışmada kullanılan animasyon tekniğinin sözel kelime çalışmalarında dikkat, algı ve kelime ilişkilerinin kurulmasında yazılı geribildirimden daha etkili olabileceği çalışma sonuçları arasında yer almaktadır.
Sonuçlar ve Öneriler: Çalışma sonuçları BDDÖ materyallerinde yer alan kelime çalışmalarında kullanılan geribildirim türlerinin farklı etkileri olduğuna işaret etmektedir. Çalışma sonunda sözel geribildirim kullanımına ilişkin önerilere yer verilmiştir. Bu öneriler arasında doğru cevabın sunulduğu sözel geribildirimin verilmesinden sonra geçen süre ve doğru cevabı içeren geribildirimin etkinliğinin arttırılmasında animasyon kullanımı ile tekrar sayısı, deneme sayısı ve sözel-görsel yardımcıların önemi yer almaktadır.
Anahtar Sözcükler: Sözel geribildirim, geribildirim türleri, geribildirim teknikleri, BDDÖ

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Mobile Assisted Language Learning: English Pronunciation at Learners' Fingertips*

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Abstract

Problem Statement: The study of pronunciation had been a relatively neglected issue in the foreign/second language acquisition literature. Likewise, in classroom contexts, pronunciation has received less attention as compared to the other language components and skills with the belief that it is peripheral to successful communication. Yet, there is a recent revival of interest in pronunciation research.

The literature on foreign/second language acquisition highlights that in general in-class activities are not sufficient for effective language learning and that learners should also have input and output opportunities outside the classroom. This holds true for learning pronunciation as the literature suggests that just classroom instruction has a negligible impact on oral production of learners.

With their widespread use and their features such as mobility, localization, and personalization, mobile phones offer a great potential for out-of-class learning. Yet, there is scarce research on the use of mobile phones in language learning contexts nor any on using mobile phones to improve learners' pronunciation. This study is aimed to make a significant contribution to the literature in these respects.

Purpose of the Study: The major aim of this study was to investigate the potentials and effectiveness of using mobile phones in foreign language education. In particular, the effects of using multimedia messages via mobile phones for improving language learners' pronunciation of words were explored.

Methods: A mixed method approach involving both quantitative and qualitative components was employed in this study. The quantitative part

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of the study followed a pre-test/post-test quasi-experimental design. The qualitative part of the study included post-study semi-structured interviews with the students, and a questionnaire involving open ended items. The participants of this study were a group of students attending the English Preparatory School of an English-medium university in Turkey. There different groups were formed in order to investigate the comparative effectiveness of supplementary materials delivered through 3 different means: mobile phones, web pages, and handouts.
Results: Analyses of the quantitative data showed that using mobile phones had positive effects on students' pronunciation learning. The qualitative data collected through the questionnaire and the interviews supported this finding. All participants provided positive feedback about the mobile learning application used in this study.
Conclusions and Recommendations: This study extends the use of use mobile phones, which are already in use for communication and entertainment, to educational settings. The findings of the study pose crucial implications for foreign language teaching and learning.
Keywords: language learning, pronunciation, mobile phones, mobile learning, instructional technology, multimedia.

The study of pronunciation had been a relatively neglected issue in the foreign/second language acquisition literature. Likewise, in classroom contexts, pronunciation has received less attention as compared to the other language components and skills with the belief that it is peripheral to successful communication. Yet, there is a recent revival of interest in pronunciation research. (Jenkins, 1998, 2000, 2002, 2004; Canagarajah, 2005). It has been recognized that acquiring pronunciation is crucial part of language learning (Dalton & Seidlhofer, 1994; Keys & Walker, 2002; McArthur, 2001) and that language learners need to have intelligible pronunciations to be able to express themselves more clearly in a variety of situations (Lowenberg, 2002; Levis, 2005; McArthur, 2001; McKay, 2002; Seidlhofer, 2004, 2005; Widdowson, 2003).

The literature on foreign/second language acquisition highlights that in general in-class activities are not sufficient for effective language learning and that learners should also have input and output opportunities outside the classroom. This holds true for learning pronunciation as well as the literature suggests that classroom instruction has a negligible impact on oral production of learners (Celce-Murcia, Brinton, & Goodwin, 1996). Thus, it is crucial that language learners are provided with input and practice opportunities outside the classroom in order improve their pronunciation. However, especially in English as a Foreign Language (EFL) settings, learners are not naturally exposed to the target language out of the class.

Use of technology in many areas of language teaching/learning has become widespread in recent years (Neri, Cucchiarini, Strik, & Boves, 2002; Nunan, 2005; Zhao, 2003). "However, one area that remains both problematic and contentious is that of oral language development," as Nunan (2005, p. 2) also acknowledges. Although technological advances presents vast amount of opportunities for

improving learners' oral skills, it is a largely untapped resource for language learners. In terms of research, too, "this area is in its infancy" (Nunan, 2005, p. 3).

With their widespread use and their features such as mobility, localization, and personalization, mobile phones offer a great potential for out-of-class learning. Yet, there is scarce research on the use of mobile phones in language learning contexts nor any on using mobile phones to improve learners' pronunciation. This study is aimed to make a significant contribution to the literature in these respects.

Among all technological devices available in our era, mobile technologies including mobile phones and pocket computers are the most popular ones, and they have an important place particularly in young people's lives. All over the world – except for Canada– the mobile phones outnumber the personal computers with 5 to 10 times the total number of mobile phones as compared to the number of personal computers (Prensky, 2005). This result is consistent with the research report published by Telecommunications Authority of the Republic of Turkey (Turkstat, 2006). According to this report, 83% of the 4322 households included in the study across Turkey have at least one mobile phone. On the other hand, only 18.5% of them have home computers.

As mentioned earlier, educational research highlights that in-class activities are not sufficient for effective learning and that exercise and practice activities should also be carried out outside the classroom (Koren, 1999). Although this consideration is expressed by many teachers, students do not put in adequate effort for studying outside the classroom. The most important reason for this could be learners' lack of intrinsic motivation to start studying. Significance of motivation for effective learning is expressed by many educators (e.g., Alessi & Trollip, 2001, Keller, 1987). The push aspect of mobile phone technology may break these motivational barriers to learning for many students, and it may free the learner from studying in front of a computer screen. By the push aspect, it is meant that the instructional materials are sent to the learners via mobile phones. In other words, a stimulus comes from an external source. While in cases where computer technology is used in education, students are required to access a computer for doing certain educational tasks which restricts the learning process to place, time and opportunity. As the student is required to be at a specific place at a specific time, learning process is considerably hindered. On the other hand, when mobile learning is used, the students are encouraged to study through materials they receive via multimedia or short messages independent of time and space, without opening the course book or lecture notes, without connecting to a web site or sitting in front of a computer or using educational software.

Mobile phones have great potential to provide supplemental practices for students outside the school. As Thornton and Houser (2004) stated, "mobile phones can help extend learner opportunities in meaningful ways" (p. 1). Yet, there is very little research on the use of mobile phones in language learning contexts. With this consideration, the major aim of this study was to investigate the potentials and effectiveness of using mobile phones in foreign language education. More

specifically, the effects of using multimedia messages via mobile phones for improving language learners' pronunciation of words were explored.

This study is limited to only three classes (each consists of 8 students) in an English preparatory school of a private university in Ankara. Fraenkel and Wallen (2000) identified two main threats (population validity and ecological validity) related to generalizability of the experimental studies. The generalizations of the findings of this study were limited since convenience sampling was utilized in the present study. However, the findings of this study can be generalized to populations having the same characteristics described in the method part of the study. Moreover, the results of the present study can be generalized to classroom settings similar to this study since the treatments and the instruments were utilized in regular classroom settings.

Method

Design of the Study

A mixed method approach involving both quantitative and qualitative components was employed in this study as shown in Figure 1. The quantitative part of the study followed a pre-test/post-test quasi-experimental design. The treatment continued four weeks.

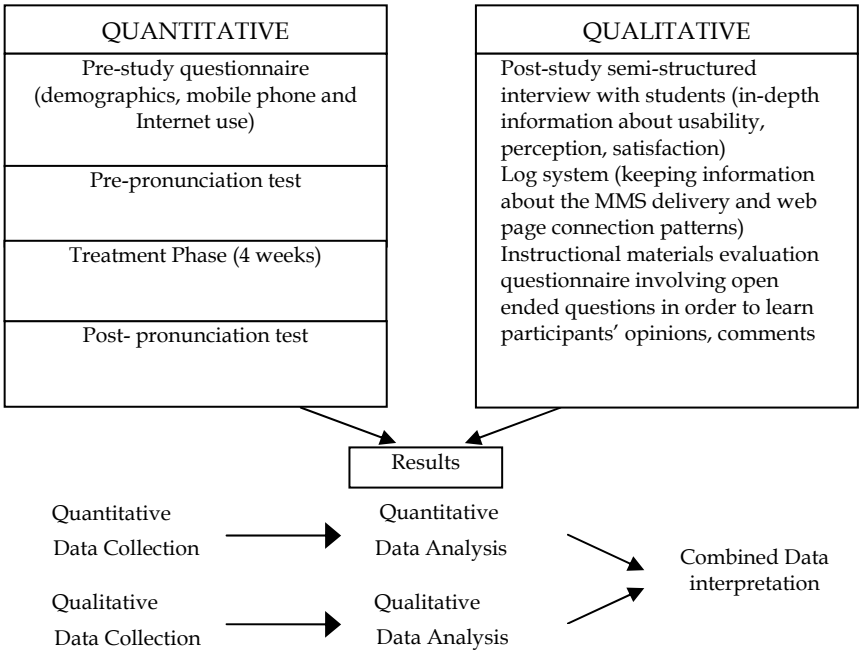

Figure 1. Visualization of the research design used in the study.

The researchers recorded the students' pronunciations by using digital voice recorder just before and after the treatment. A native rater and a nonnative instructor from the preparatory school evaluated the recordings according to the Educational Testing Service (1985) rubric displayed below:

0: Frequent phonemic errors and foreign stress and intonation patterns that cause the speaker to be unintelligible.

1: Frequent phonemic errors and foreign stress and intonation patterns that cause the speaker to be occasionally unintelligible.

2: Some phonemic errors and foreign stress and intonation patterns, but speaker is intelligible.

3: Occasional nonnative pronunciation errors, but speaker is intelligible.

The qualitative part of the study included post-study semi-structured interviews with the students, and a questionnaire involving open ended questions. The data collected from the interviews and questionnaires were also compared with the log system data which included information about the MMS delivery and web page connection patterns. This comparison allowed the researchers to verify participants' responses and increased the reliability of results.

Participants

The participants of this study were 24 students attending the English Preparatory School of an English-medium university before they have started their studies in their departments. A purposeful sample of students was selected based on the data collected through a pre-study questionnaire. This survey instrument included items related to the demographic information about the students, their mobile phone ownership, their use of mobile phones and Internet in their daily life, etc. This instrument was distributed to all students at the beginning of the academic year.

There were three levels as beginner, elementary, and pre-intermediate at the English preparatory school. Only the elementary level was included in this study. Three different groups were formed in order to investigate the comparative effectiveness of supplementary materials delivered through 3 different means: mobile phones, web pages, and handouts. The mobile group was formed with the students who had multimedia message (MMS) supported mobile phones, and the web group was formed involving the students who had home computers connected to the Internet. There were 8 students in each group (See Table 1).

Table 1

Distributions of Participants by Gender.

Gender	Mobile	Handout	Web
Female	5	4	5
Male	3	4	3
Total	8	8	8

Research Questions

1. Does the mean change (mean difference between pre- and post-tests) in the pronunciation test scores differ among the three groups: mobile, web, and handout?

2. What are the students' perceptions of the use of the mobile phones in their pronunciation learning?

Procedures

The study was conducted during the Fall 2007 semester. The implementation phase continued for 4 weeks. Three different study modes (mobile, handout, and web) were used as a supplement to regular classroom instruction in order to explore the comparative effectiveness of supplementary materials delivered through 3 different means: mobile phones, web pages, and handouts in improving learners' pronunciation of words. Table 2 explains these three study modes.

Table 2

Study Modes Used in the Study

Study mode	**Explanation**
Mobile	Study materials were sent to participants' mobile phones as multimedia messages (MMS) on different times in a day.
Handout	Study materials were distributed to participants as colored handouts on each day. The instructor pronounced each word after distributing handouts.
Web	Study materials were published on a web page in each day. Only registered participants can access these materials.

A total of 80 English words were included in the study. Twenty of them that students had generally difficulty in pronouncing were involved in the pronunciation test. Four words a day were delivered to the participants by using one of the modes that their group belongs to. Multimedia messages were sent during lecture breaks on school days with an hour time space between messages. The handouts including 4 words of the day were distributed after the first lecture session in the morning, and the same 4 words of the day were published on the Internet at 9:00 am. By its very nature the handout group could not access the words' pronunciations all the time. In order to minimize the effects of this weakness, the instructor pronounced all the words while distributing the handouts. Before and during the implementation, the participants were informed and encouraged about the importance of self-pronouncing the words by the instructors. The next section explains the nature of instructional materials used in the study in detail.

Nature of the Instructional Materials

The English words included in this study were selected from the contents of the regular classroom instruction since the aim of this study was to provide

supplementary practice to regular classroom instruction. In this study, three types of instructional materials, namely, multimedia messages, web pages, and colored handouts were developed. The multimedia messages (MMS) in this study allowed students to see the definitions of words, example sentences, related pictures, and pronunciations as shown in Figure 2. The maximum size of MMS sent to subjects was 30 KB including the sound file. This indicates a small size that can be transferred to students' mobile phones in a short time (10-15 sec.), and students can store approximately 8.700 MMS in a 256 MB memory (1 MB=1024 KB). The 3 pictures shown in Figure 2 in order from left to right were saved as an animated picture file which pauses 8 seconds between the 3 pictures. The duration of pauses could be adjusted depending on the specific content of each message.

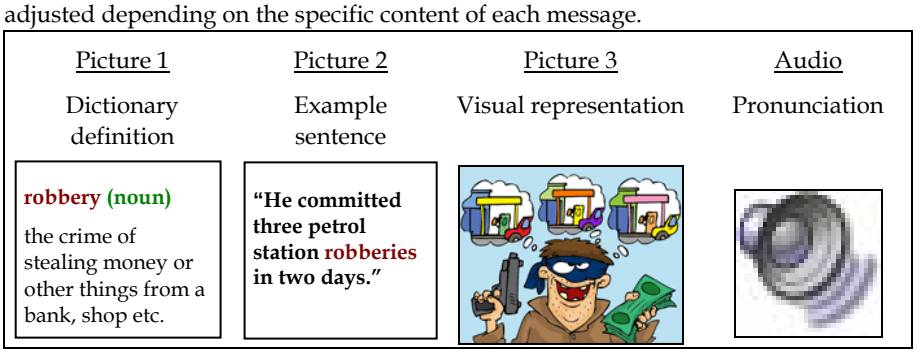

Figure 2. An example MMS used in the study.

The web pages and handouts were developed by using the same content used in the MMS. Figure 3 shows a screenshot from the web application, and Figure 4 shows an example handout used in the study.

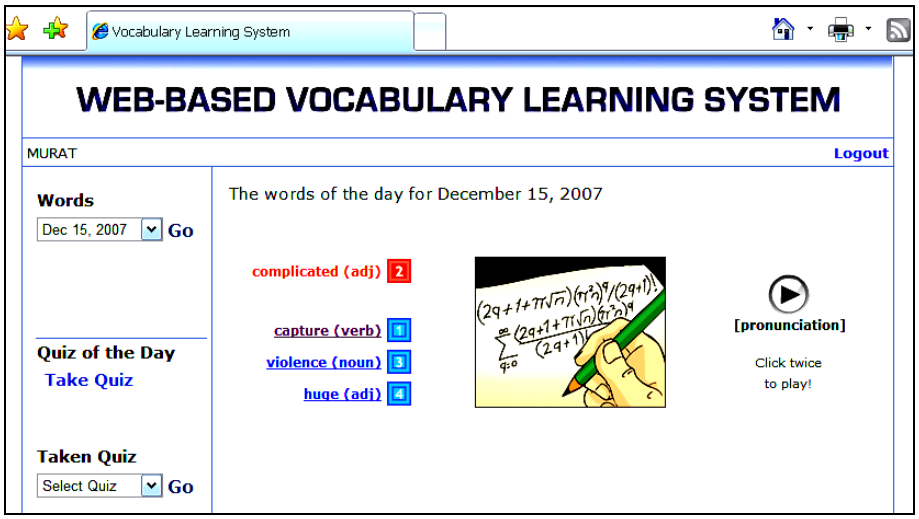

Figure 3. A screenshot from the web application used in the study

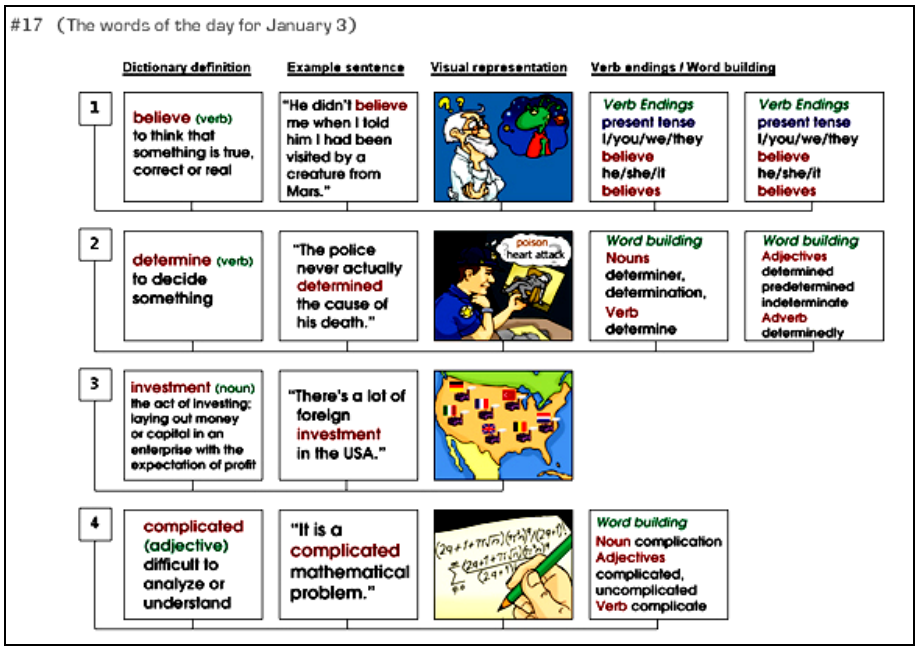

Figure 4. An example handout used in the study.

Findings and Results

In this section, first the results of the analyses of the data obtained via open-ended questions related to the multimedia message usage patterns will be presented. This will be followed by results of the statistical analyses of the scores on the pre and post tests. Finally, the interview results will be provided.

Results of the Questionnaire on the MMS Usage

All of the subjects (n=8) in mobile group reported that they read all the multimedia messages that were sent throughout the study. Moreover, all of them stated that they read the messages more than once. Seventy five percent of the participants reported that they listened to the pronunciations more than twice. The average number of times that students listened to pronunciations is 3.62. In addition, a great majority of the students (87.5%) reported that they saved the multimedia messages on their phones for future use. These findings suggest that the multimedia messages encouraged the students to repeat the study materials.

It was one of the aims of this study to find the most suitable scheduling for MMS delivery. Students were sent four multimedia messages in a day on lecture breaks with an hour time space between messages. Students' responses to the questionnaire indicated that the most suitable number of MMS to be sent in a day is four (see Table 3).

Table 3

Distribution of Participants' Responses on the Implementation

	n	%
Have you read the multimedia messages that were sent throughout the study?		
Yes	8	100
No	0	0
On an average, how many times did you read each MMS throughout the study?		
1	0	0
2	2	25
3	2	25
4	2	25
More than 4	2	25
Did you save the multimedia messages in your mobile phone?		
Yes	7	87.5
No (Due to insufficient memory)	1	12.5
What do you think about the number of 4 MMS sent in a day?		
Few	1	12.5
Enough	6	75
Much	1	12.5
What do you think about an hour time space between multimedia messages?		
Short	1	12.5
Enough	7	87.5
Long	0	0

A great majority of the participants (75%) found four multimedia messages in a day just right, 12.5% of them found it to be few, and 12.5% of them found it too much. Similarly, subjects reported that an hour time space is the most suitable interval between messages. 87.5% of the participants reported that an hour time space is enough, 12.5% of them found it to be short, and none of them found it too long. To sum up, the results of the questionnaire indicate that participants made use of the study materials that were sent as multimedia messages via mobile phones and they found the scheduling used in the study to be appropriate for them.

Pronunciation Gain

As stated in the methods section, students' pronunciations were rated according to the Educational Testing Service (1985) criteria. Figure 5 shows a screenshot from the MS Excel spreadsheet used by the raters also presenting the English words included in the study. Table 4 shows the average scores and standard deviations of pre- and post-tests, and gain scores for each group of students studying identical materials via three different means: mobile MMS, handout, and web.

	Student 1					Student 2				
	PRE	Grade	POST	Grade			PRE	Grade	POST	Grade
1. accurate		1		3		1		0		0
2. believe		1		2		2		2		3
3. cause		2		2		3		2		3
4. challenging		2		1		4		2		3
5. complicated		2		2		5		1		2
6. decrease		1		2		6		0		2
7. determine		1		1		7		1		1
8. envy		2		3		8		0		0
9. evidence		2		3		9		1		0
10. evolve		2		2		10		1		2
11. examine		1		3		11		0		1
12. function		3		2		12		3		3
13. important		2		3		13		3		3
14. increase		2		2		14		2		2
15. ingredient		2		3		15		0		1
16. oppose		2		2		16		2		2
17. plain		2		3		17		1		2
18. pollution		1		3		18		0		0
19. prevent		2		2		19		0		0
20. violent		1		2		20		0		0
	Total	34		46				21		30

Figure 5. A screenshot from a MS Excel spreadsheet used by the raters

The gain scores (average difference between post- and pre-tests) are 11.94, 6.81, and 6.81 for mobile, handout, and web groups respectively. The results indicate that mobile groups performed better than handout and web groups as illustrated in Figure 6.

Table 4

Means and Standard Deviations of the Pre-test, Post-test, and Gain Scores

		Pre-test*		Post-test*		Gain**	
Group		*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
Mobile	(n=8)	29.19	8.99	41.13	8.29	11.94	2.90
Handout	(n=8)	30.88	3.23	37.69	3.27	6.81	4.46
Web	(n=8)	31.50	5.79	38.31	3.80	6.81	3.71

* Maximum score that can be obtained from the test was 60.

** Gain is the average difference between post- and pre-tests.

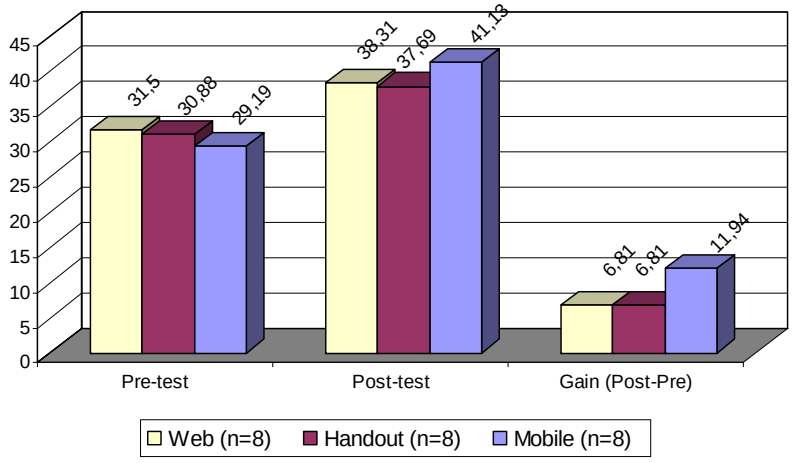

Figure 6. Comparison of mean scores on pronunciation test.

In order to understand whether the differences are statistically significant or not, one-way ANOVA was conducted. The ANOVA was significant, F (2, 21) = 5.000, p = .017 (see Table 5). The strength of relationship between treatment and gain scores, as assessed by Eta Squared, was strong, with the treatment factor accounting for 32% of the variance of the dependent variable.

Table 5

The Results of ANOVA Analysis Concerning Each Group's Gain Scores

ANOVA Gain Scores (Post-test – Pre-test)	Sum of Squares	df	Mean Square	F	Sig.	Eta Squared
Between Groups	140.083	2	70.042	5.000	.017	.323
Within Groups	294.156	21	14.007			
Total	434.240	23				

Because the overall ANOVA was significant, follow-up test was conducted to evaluate pair-wise differences among the means as shown in Table 6. Because the variances among the three groups were not significantly different according to the Levene's test of homogeneity of variance (p=.218), Tukey HSD test was conducted for the post-hoc comparisons. Tukey HSD test showed that there was a statistically significant mean difference between mobile and the other two groups with a p value smaller than .05 (p=.032). On the other hand, there was not a statistically significant mean difference between handout and web groups with a p value 1.000 greater than .05.

Table 6

The Results of Homogeneity of Variance Test and Post-Hoc Comparisons

Levene's Test of Equality of Error Variances

Gain scores (Post-test – Pre-test) on pronunciation test

F	df1	df2	Sig.
1.638	2	21	.218

Multiple Comparisons

Dependent Variable: Gain scores (Post-test – Pre-test)

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Mobile	Handout	5.1250(*)	1.87133	.032	.4082	9.8418
	Web	5.1250(*)	1.87133	.032	.4082	9.8418
Handout	Mobile	-5.1250(*)	1.87133	.032	-9.8418	-.4082
	Web	.0000	1.87133	1.000	-4.7168	4.7168
Web	Mobile	-5,1250(*)	1.87133	.032	-9.8418	-.4082
	Handout	.0000	1.87133	1.000	-4.7168	4.7168

* The mean difference is significant at the .05 level.

To sum up, the results suggest that students who were sent multimedia messages studied supplementary materials more than students who studied the web- and paper-based materials and this frequent supplementary study helped to better pronunciation of words. The findings of the study suggest that sending multimedia messages via mobile phones uses the push aspect of mobile technology, and encourages regular study. Therefore, the delivery of foreign language pronunciation study materials as multimedia messages via mobile phones may lead to better learning. Interestingly, gain scores on pronunciation tests are the same for handout and web groups. Although web group students had chances to access pronunciations

via Internet at any time, their performance is the same with handout groups who had no chances to access pronunciation audios outside the classroom. This result suggests that using web pages for pronunciation learning does not encourage regular study and therefore does not lead to better performance that can be achieved through traditional ways like handouts and -classroom activities.

Interview Results

The interview questions were aimed to gather in depth opinions of the students about their mobile learning experience. The researchers conducted interviews with six students in the mobile group. The qualitative data collected through the interviews were analyzed to obtain the perceptions of students about the use of mobile phones for pronunciation learning, and to get students' suggestions concerning the improvement of the features used in the study. According to the results of the collected data, students believed that the use of mobile phones for pronunciation learning is very effective. The participants reported several positive aspects of the treatment in the interviews.

With the first question, the students were asked whether they studied the materials that were sent via mobile multimedia messages or not. All students (n=6) stated that they studied the materials. These statements were in parallel with the results of the questionnaire analysis and the log data. All of the students provided positive feedback about the mobile learning application used in this study. The students stated that they enjoyed the instructional materials sent to their mobile phones during the study. Most (n=5) of the students stated that it would be better if they were always supported with instructional materials via mobile phones like the ones they used during the experiment.

Almost all of the participants stated that the content itself and the organization of the content, especially audio-visual representations of words were very effective for retention of pronunciation of words. Two students voiced their ideas as follows:

The audio component in the multimedia messages together with the visual representations were very effective in helping us learn pronunciation of words accurately

Because the content was delivered via multimedia messages to my cellular phone, I was able to learn how to pronounce words correctly and easily. The messages remained accessible on my phone and in my memory.

As another advantage of this treatment, one of the students stated,

I had the chance of repeating the content as many times as I wanted and this was an advantage of using mobile phones when compared with the other methods

All of the participants indicated that they did not face with any difficulties while using the mobile learning application and that it was easy-to-use since they were used to using SMS and MMS in their daily lives.

Conclusions and Recommendations

Mobile phone learning is a young discipline that is gaining more and more attention because of its promises for education (Chinnery, 2006; Kiernan & Aizawa, 2004; Thornton, & Houser, 2004). On the other hand, some people have still serious doubts to adopt mobile devices into learning environments. They think that the user interface of mobile devices is quite limited and cannot display information-rich content in a useful way. We believe that this is not a significant constraint for today's technology considering the explosive development of the Information and Communication technologies. The processing and storage capabilities of mobile devices have improved for the last five years, and this resulted in high voice and graphic quality, and ease of use. This study showed that carefully designed instructional materials for mobile devices can display information-rich content such as visual representations, textual information, audio, animations, etc.

The results suggest that students who were sent multimedia messages studied supplementary materials more than students who studied the web- and paper-based materials and this frequent supplementary study helped to better pronunciation of words. Moreover, findings obtained from the interview data indicated that students believed that the use of mobile phones for pronunciation learning is very effective.

The results of this study indicate that majority of the students own and frequently use mobile phones in their lives. This study extends the use of mobile phones, which are already used for communication and entertainment, to education. The results of this study suggest that using mobile phones in educational settings may help learners be more motivated and might make it possible to overcome the difficulties teachers or parents experience in order to make learners start studying. The findings of the study suggest that sending multimedia messages via mobile phones uses the push aspect of mobile technology, and encourages regular study. Therefore, the delivery of foreign language vocabulary study materials as multimedia messages via mobile phones may lead to better pronunciation of words.

Furthermore, learners might be able to use any previously wasted time (on the bus, on their way back and to school) on learning languages with the chance of repeating the mobile content as many times as they want conveniently as the words would be at their finger tips on their mobile phones. The results of this study suggest that learners can improve their pronunciation on their own with the use of mobile phones and the implications of this study point to a possible new pedagogy.

New opportunities and exciting prospects afforded by innovative technologies are unfolding in teaching pronunciation. More research to enhance our knowledge of the nature of pronunciation and to inform us on alternative ways to improved pronunciation is called for. English language teachers, material writers, and researchers should juggle around with these new developments in pronunciation teaching/learning and redefine their teaching, assessment and research priorities in the light of these new prospects.

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Cep Telefonu Yardımıyla Dil Öğrenme: İngilizce Telaffuz Öğrenimi Parmaklarınızın Ucunda (Özet)

Problem Durumu: Yabancı dil edinimi alan yazınında telaffuz ile ilgili yapılan araştırmalar göreceli olarak az sayıdadır ve dil ediniminin diğer boyutlarıyla karşılaştırıldığında bu konu ihmal edilmektedir. Benzer şekilde, sınıf ortamlarında da diğer dil bileşenleri ve becerileri ile karşılaştırıldığında başarılı bir iletişim için daha arka planda olduğuna inanıldığı için telaffuz öğretimine daha az ilgi gösterilmektedir. Bununla birlikte son zamanlarda telaffuz araştırmalarına olan ilginin artmakta olduğu da gözlenmektedir.

Yabancı dil öğretimi ile ilgili alan yazında sınıf içi aktivitelerin etkili dil öğrenimi için, özellikle de kelime kazanımı için yeterli olmadığı, sınıf dışında da alıştırma ve uygulama çalışmaları yapılması gerektiği vurgulanmaktadır. Bu telaffuz öğrenimi için de geçerlidir. Sınıf içinde yapılan öğretim tek başına öğrencilerin konuşma yeteneğini çok az geliştirebilmektedir.

Cep telefonlarının sahip olduğu ulaşılabilirlik, kişiselleştirilebilirlik ve taşınabilirlik gibi kendine özgü nitelikler, sınıf dışında yapılması gereken alıştırma ve uygulama çalışmalarının gerçekleştirilmesinde büyük bir

potansiyele sahiptir ve birçok yarar sağlayabilir. Örneğin, öğrencilerin/kullanıcıların ders çalışmaya başlamalarını zorlaştıran motivasyon ile ilgili problemlerin ortadan kaldırılmasında cep telefonlarının çoklu ortam veya kısa mesaj özelliği kullanılabilir. Bu çalışmada, öğrencilere çoklu ortam mesajları ile alıştırma ve uygulama materyalleri gönderilerek çalışmaya teşvik edilmektedirler. Bu sayede öğrenciler ders notu ya da ders kitabını açmadan, herhangi bir web sitesine bağlanmadan ya da bilgisayar karşısına geçmeden, özel bir öğretim yazılımı kullanmadan yer ve zamandan bağımsız olarak konu tekrarı, alıştırma ve uygulama yapabilmektedirler. Böylece, birçok öğrenci için aşması zor olan ders çalışmaya başlama motivasyonu dış kaynaktan gelen bir itici uyaran aracılığıyla aşılmaktadır.

Yukarıda bahsedilen potansiyelleri kullanarak dil öğreniminde cep telefonlarının kullanımını araştıran çok az sayıda çalışma vardır. Aynı zamanda öğrencilerin telaffuzlarının geliştirilmesinde cep telefonlarının kullanılması üzerine yapılan araştırmalar yok denecek kadar azdır. Bu çalışma bu eksikliği gidererek alan yazına anlamlı katkılar sağlamayı hedeflemektedir.

Araştırmanın Amacı: Bu çalışmanın temel amacı cep telefonu teknolojisini kullanarak eğitim ve öğretim süreçlerinin etkin ve verimli hale getirilmesine katkıda bulunmaktadır. Bu çalışma ile İngilizce eğitiminde, cep telefonlarının kullanımı ile ilgili potansiyelleri ortaya çıkarmak ve özellikle cep telefonlarının telaffuz öğrenimine olan etkilerinin araştırması hedeflenmektedir.

Araştırmanın Yöntemi: Bu araştırmada nitel veriler, nicel verilerle elde edilen bulguları desteklemede kullanılmıştır. Toplanan nitel ve nicel veriler hibrit yöntemler kullanılarak analiz edilmiştir. Nicel veriler ANOVA analizine tabi tutulmuş; nitel verilen analizinde ise örüntü analizi işe koşulmuştur. Araştırmanın nicel kısmında ön-test/son-test yarı-deneysel tasarım deseni kullanılmıştır. Nitel kısmında ise araştırma sonunda öğrencilerle yarı-yapılandırılmış görüşmeler yapılmış ve açık uçlu soruların yer aldığı değerlendirme anketi uygulanmıştır. Çalışmanın katılımcıları Ankara'da bulunan bir üniversitemizin İngilizce hazırlık okulundaki öğrencilerdir. Cep telefonlarının etkinliğini araştırmak için aynı içeriğin cep telefonu yoluyla, web sayfası üzerinden ve çalışma notları dağıtılması ile işlenmesinin kelimelerin doğru telaffuzlarının öğrenilmesinde etkililiği karşılaştırılmıştır.

Araştırmanın Bulguları: Nicel verilerin analiz sonuçları cep telefonu kullanımının telaffuz öğreniminde olumlu etkileri olduğunu göstermiştir. Bu çalışmada kullanılan üç farklı yöntem ile telaffuz öğrenimleri desteklenen cep telefonu, web sayfası ve çalışma notları gruplarının son-test ile ön-test arasındaki farklarının ortalamaları diğer bir ifadeyle telaffuz kazanımları sırasıyla şu şekildedir: 11.94, 6.81 ve 6.81. Bu sonuçlara göre cep telefonu grubundaki öğrencilerin telaffuz testi ile ölçülen telaffuz kazanımları diğer gruplara göre daha yüksektir. Varyans analizi (one-way ANOVA) testi analiz sonuçları da cep telefonu ve kontrol gruplarının telaffuz kazanımları arasındaki farkın istasistiksel olarak anlamlı olduğunu

göstermektedir (F (2, 21) = 5.000, p = .017). Bu anlamlı farkın hangi gruplar arasında olduğunu anlamak için Tukey HSD testi kullanılarak Post hoc karşılaştırmalar yapılmış ve bu test sonucunda cep telefonu grubu öğrencilerinin telaffuz kazanımlarının diğer iki gruptaki öğrencilerin kazanımlarından anlamlı olarak farklı olduğu (p=.032) ortaya çıkmıştır. Diğer taraftan web sayfası ve çalışma notu gruplarındaki öğrencilerin birebir aynı sayıda kelimenin telaffuzlarını öğrendikleri ortaya çıkmıştır (p=1.000). Özet olarak, bu sonuçlar cep telefonu üzerinden öğrencilere gönderilen ek materyallerin telaffuz kazanımı için daha etkili olduğunu göstermektedir.

Görüşmelerde ve açık uçlu anket sorularına verilen cevaplar bu sonucu desteklemektedir. Bütün katılımcılar kullanılan cep telefonu uygulaması hakkında olumlu geri bildirimler vermişlerdir. Örneğin bir öğrenci bu uygulamanın faydaları ile ilgili görüşlerinin istendiği soruya şu şekilde cevap vermiştir: "*Sesli boyut kelimelerin telaffuzunu düzgün öğrenmemizi sağlıyor. Görsel efektlerle desteklendiği için daha kalıcı olabiliyor"* Benzer bir cevap olarak başka bir öğrenci de*"Telaffuzları kolay bir şekilde öğrenebildim. MMS şeklinde yollanması sayesinde görsel ve işitsel olarak gördüğümüz kelimelerin telaffuzları daha hafızada kalıcı oldu."* ifadelerini kullanmıştır.

Araştırmanın Sonuçları ve Önerileri: Cep telefonları genç nüfus için teknolojik aygıtlar arasında en popüler olanıdır ve çoğu kişinin yaşamında önemli bir yer tutmaktadır. Bu çalışmada temel hedeflerden bir tanesi genç nüfus tarafından cep telefonlarına gösterilen büyük ilgiden faydalanarak, ülkemizde bu teknolojinin eğitimde kullanımının önünü açmaktır. Bu hedefe ulaşabilmek için daha çok iletişim ve eğlence amacıyla kullanılan cep telefonlarının eğitim amacıyla nasıl kullanılabileceği hakkında örnek bir uygulama gerçekleştirilmiştir. Böylelikle cep telefonlarına yeni bir işlev kazandırılmıştır. Bu çalışmanın sonuçları yabancı dil eğitimi ve öğreniminde cep telefonu kullanımı ile ilgili potansiyel uygulamalar hakkında araştırmacılara yol gösterici olabilir.

AnahtarKelimeler : dil öğrenimi, telaffuz, cep telefonu, mobil öğrenme, öğretim teknolojileri, çoklu ortam.

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Second Language Vocabulary Acquisition in Synchronous Computer-Mediated Communication

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Abstract

Problem Statement: Communication has become easier than ever with high-speed Internet connection and other mobile technologies; and, technology has proven itself as a valuable contribution to educational practices when used in a pedagogically sound manner. Only few studies provide empirical evidence supporting the connection between negotiation of meaning in synchronous communication environments and second language vocabulary acquisition.

Purpose of the study: The study aims at providing further support for the Interaction Hypothesis by investigating whether negotiation of meaning in synchronous computer-mediated communication facilitates language learners' subsequent ability to recognize and produce new vocabulary and whether observed differences hold up over time.

Method: In this quasi-experimental study, 11 intermediate college-level learners of French and Russian in a foreign language learning context and prospective language teachers as native speakers had six 30-minute synchronous online chat sessions completing communicative tasks. Using a mixed-methods approach, both quantitative and qualitative data were included in the analysis. Chatscripts were analyzed using an interactional analysis method. Negotiation episodes around the vocabulary items that were previously reported as unknown by language learners were identified in each chat session. Descriptive and inferential statistics were used to analyze learners' pretest, posttest, and delayed posttest scores.

Findings and Results: Language learners and prospective teachers negotiated meaning while completing communicative tasks. Prospective language teachers took the role of a more competent partner in the tasks. The study provides evidence for the positive effect of synchronous computer-mediated communication on second language vocabulary acquisition. Language learners in both French and Russian groups were

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able to understand the meaning of the previously unknown vocabulary items and produce those vocabulary items after completing online tasks with prospective teachers. However, vocabulary gains of the language learners did not hold up over a two-week period.
Conclusions and Recommendations: Overall, the online communication experience proved to be a positive component that can be integrated into language learning and teaching contexts. Empirical support for the Interaction Hypothesis was provided through the findings of this study. Integrated into language curriculum rather than being an add-on component, such online activities could be enhanced through embedding further revision of the newly learned vocabulary items into the design process. Mimics, gestures, and keystrokes could be captured through the use of usability lab technologies, which would enhance the data sources for the analysis. Further research could be conducted with the focus on various aspects of the target language such as grammar, pragmatics (politeness, apologies, etc.), and phonology/graphology.
Keywords: Computer-mediated communication, computer-assisted language learning, foreign language learning, second language vocabulary acquisition, Interaction Hypothesis, technology

Computers are becoming more and more ubiquitous. Communication has become easier than ever with high-speed internet connection and other mobile technologies. Instant messaging applications which enable users to have audio and video conversations are used widely and attract new users with their user-friendly interfaces and appealing features.

Online communication tools have a lot to offer for language educators to enrich their teaching. Learners of a foreign language (FL), unlike second language (L2) learners, usually have limited opportunities to practice the target language (TL) outside the classroom. Through the Internet, FL and L2 learners can have access to the TL by communicating with native speakers or learners of that same language.

Computer-mediated communication has been the focus of a large body of studies in the field of computer-assisted language learning (CALL) (e.g., Blake, 2000; Chapelle, 2003; Pellettieri, 2000; Smith, 2004). Findings of such studies and discussions on the role of CMC in language learning and teaching suggest that communication between two parties (L2 and/or FL learners and native speakers) or among the learners themselves on certain communicative tasks can create favorable conditions for second language acquisition. Nevertheless, only a few of those studies provide empirical evidence on a positive relationship between online communication experience and second language acquisition (e.g., Smith, 2004). Moreover, only a few research studies have focused on synchronous computer-mediated communication (SCMC) between FL learners and prospective teachers of that same language (e.g., Wang & Sun, 2001). Most of the dyads used in previous studies (e.g., Blake & Zyzik, 2003; Toyoda & Harrison, 2002) on CMC have been NS-NNS (native speaker–non-native speaker [both learners]), NNS-NNS, and NNS-HS (heritage speaker).

The current study aims at investigating the impact of SCMC on second language vocabulary acquisition. Negotiation of meaning and acquisition of vocabulary items as a result of negotiation will be the focus of research questions. The current research was conducted through collaboration between a university in Quebéc, Canada; an institute in St. Petersburg, Russia; and a midwestern university in the United States.

The role of interaction in second language acquisition has been the focus of many studies (e.g., Ellis, 1999; Gass, 1997; Long, 1996; Pica, 1994). In the current study, the Interaction Hypothesis (IH) is taken as a basis to analyze certain characteristics of interaction.

The IH concerns itself with one particular kind of interaction—that which has become known as **negotiation of meaning** … [in] the conversational exchanges that arise when interlocutors seek to prevent a communicative impasse occurring or to remedy an actual impasse that has risen (Ellis, 1999, p. 3).

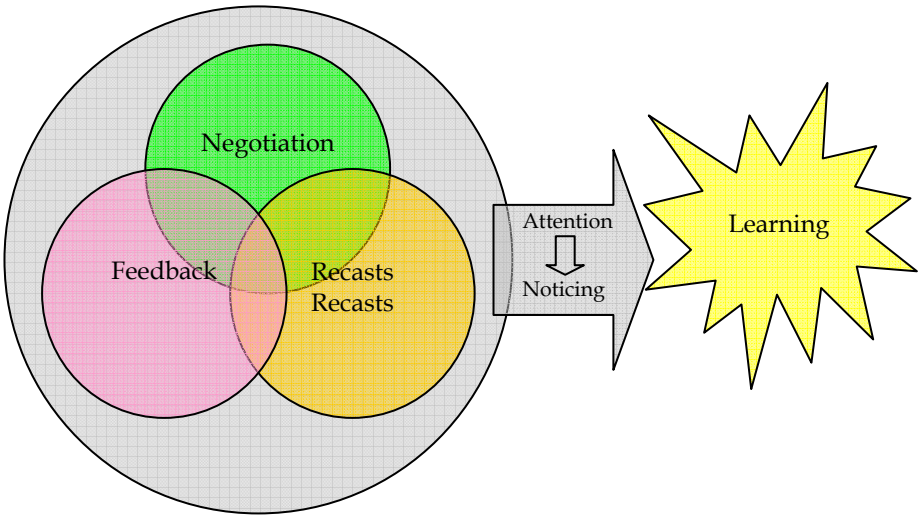

Figure 1. "Model of interaction and learning" (Gass & Mackey, 2006, p. 4)

Interaction in language learning involves negotiation, feedback, and recasts. Gass and Mackey (2006) summarized these and other components of interaction in a well-presented diagram (see Figure 1). Through negotiation, feedback, and recasts, language learners' attention is drawn to the gaps between their interlanguage and the target language. This noticing process is likely to lead to learning.

Negotiation sequences usually have the following structure outlined by Varonis and Gass (1985):

1. Trigger (i.e., the utterance that causes the communication problem);

2. Indicator (i.e., the utterance that demonstrates a communication problem has occurred);

3. Response (i.e., the utterance that attempts to address the communication problem identified in the indicator); and,

4. Reaction (i.e., the utterance that indicates a speaker's uptake to the response).

Most of the studies on CMC taking the IH as a theoretical framework suggested positive evidence to support the hypothesis that interaction through computer-mediated communication creates favorable conditions for second language acquisition to take place. By designing certain communicative tasks, it can be possible to channel learners' attention to certain target language forms. Technology provides language educators with a wide range of possibilities to achieve this (see Chapelle, 2003; Lafford & Lafford, 2005).

Several studies focused on the interaction between NNS-NNS (non-native speaker) pairs in chat conversations. Blake (2000) investigated the negotiation of meaning between 25 adult NNS of Spanish dyads in a synchronous online communication. He used three types of tasks: decision-making, information gap, and jigsaw tasks. Blake found that "jigsaw tasks appear to lead the way in promoting negotiations" (p. 1). Pellettieri (2000) investigated whether negotiation of meaning occurs in task-based synchronous NBC (network-based communication) as in oral interaction and whether it facilitates the acquisition of grammatical competence. Pellettieri argued that synchronous NBC chatting is likely to play an important role in the development of grammatical competence among classroom language learners because it "fosters the negotiation of meaning and form-focused interaction, and because students communicating through this medium have more time to process and monitor the interlanguage" (p. 83). Toyoda and Harrison (2002) examined negotiation of meaning that took place between undergraduate students and native speakers of Japanese over a series of chat conversations. The authors categorized the difficulties learners encountered in those chat conversations as follows: recognition of new words, misuse of words, pronunciation error, grammatical errors, inappropriate segmentation, abbreviated sentences, sudden topic changes, slow responses, and inter-cultural communication gaps. The study showed that the difficulties in understanding each other triggered negotiation of meaning between students even when no specific communication tasks were given.

Blake and Zyzik (2003) focused on an emerging learner profile: heritage speakers (HS). They found that heritage speakers of Spanish in a synchronous computer-assisted learning environment assisted their L2 partners much more often in completing communicative tasks. The researchers identified a variety of interactional strategies in the transcripts such as clarification requests, expansions, recasts, and self-corrections. Blake and Zyzik (2003) concluded from their analysis of HS/NNS exchanges that:

> Negotiations of meaning have a positive effect on vocabulary use … [and] demands of electronic chatting, which force the participants to produce output, often provide and immediate record of subsequent uses of new vocabulary items that might indicate a change in the L2 learners' linguistic knowledge. (p. 538)

Smith (2004) tested the Interaction Hypothesis and provided "further evidence of an explicit link between negotiated interaction and SLA (specifically the acquisition of new lexical items) in the context of computer-mediated communication" (p. 366). By using a within-groups pretest-posttest-delayed posttest design, he measured the vocabulary gain of 24 university-level ESL (English as a Second Language) students after engaging in jigsaw and decision-making tasks in SCMC. Smith found that computer-mediated negotiated interaction facilitated learners' ability to recognize and produce new lexical items. He also found some evidence that learners' vocabulary gain scores hold up over time—one week.

Computer-mediated communication environment offers various benefits and flexibility for language learning. CMC activities can be customized to focus on different components of the target language such as vocabulary. Following Smith (2004), the current study aims at providing further evidence for the link between the Interaction Hypothesis and SLA. Previous research studies have focused more on learner-learner interaction in online environments, and only few provided empirical evidence concerning the effect of such experience to second language acquisition. The current study is intended to fill this gap by engaging foreign language learners and prospective language teachers in communicative tasks in online environment both as chat partners and as language learner-competent speaker dyads.

This study seeks answers to the following research questions:

1. Does negotiation of meaning in synchronous computer-mediated communication facilitate college-level French and Russian language learners' subsequent ability to recognize and produce new vocabulary?

2. Do observed differences hold up over time?

Method

This study uses a mixed-method research design. It follows a concurrent procedure in which quantitative and qualitative data are converged in order to provide a more comprehensive analysis of the research problem (Creswell, 2003). Participants, instruments, and procedures of the study will be explained in the following section.

Participants

Twenty-two participants were involved in the study. Eight students of intermediate French and three students of intermediate Russian at a midwestern university in the US communicated with prospective teachers at a university in Québec, Canada and at an institute in St. Petersburg, Russia. The prospective teachers were all native speakers, except for one bilingual speaker.

The first language of nine of the language learners was English; one student was a native speaker of Polish, and one of Spanish. All language learners were undergraduate students except for one learner. Their participation in the study was on a voluntary basis. The online communication activity was considered as an out-of-

class activity in which students could earn extra credit. The online activities and the vocabulary items covered in those activities were not related to the students' regular coursework, but were created by the researcher in collaboration with the instructor.

Instruments

The instruments used for data collection in this study are the following:

- Pretest and posttests for language learners – The pretest consisted of 96 vocabulary items. The first 48 of those vocabulary items were integrated into the six online tasks (eight items per task). The other 48 items were chosen as distractors and were later included in the posttests again as distractors. All tests in this study were designed taking Smith's (2004) study as a basis. Immediate and delayed posttests were used to measure receptive and productive vocabulary knowledge of the language learners.

- Communicative tasks and chat scripts – For each session, one communicative task was designed in order to promote negotiation of meaning between the two parties and thus increase attention to form (Pica, Kanagy, & Falodun, 1993). Jigsaw, information-gap, and decision-making tasks were used.

Procedures

This real-time online communication was in the form of written messages and was conducted in six sessions. I pretested the learners on a list of vocabulary items that were going to be used in the tasks. I administered the pretest a week before the first chat session, asking the learners to mark the items as either known or unknown.

I sent the task descriptions to the prospective teachers in their native language via e-mail two days before each session. Each session took about 30 minutes. For each session, the instructor of the class and I predetermined a set of new vocabulary items (mainly single words) for the language learners.

There were four kinds of posttests for each session. I administered an immediate posttest (for receptive and productive vocabulary knowledge) at the end of each session and a delayed posttest (for receptive and productive vocabulary knowledge) two weeks after to the language learners in order to measure their vocabulary acquisition.

Prospective language teachers took the role of a more competent partner in the tasks. They were free to assist the L2 learners using techniques that they considered pedagogically useful in the completion of the tasks by the learners. The communication between the two parties was only in French or Russian, but the instructions for the tasks were given in English as well.

Analysis

Data consisted of chat scripts, pretests, and posttests. Data from a total of 60 chat sessions were analyzed. I used JMP 6.0 and SPSS 14.0 for quantitative analyses. Approximately 30 hours of chat data were analyzed. Chat scripts were analyzed qualitatively, whereas both descriptive and inferential statistics were used to analyze the posttest scores of the learners. An interactional analysis was conducted in order

to examine some characteristics such as negotiation of meaning (e.g., clarification requests, confirmation checks) around the essential vocabulary. Ellis and Barkhuizen (2005) depict interactional analysis as "a means of describing the interactions in which learners participate" (p. 166). The authors state "interactional analysis tells us what kinds of function learners perform when they interact with other learners or native speakers in different contexts and the structural properties of these conversations [, which helps us understand] "how learners interpret the instructional tasks they are given" (p. 166).

Negotiation sequences were determined using Varonis and Gass's (1985) model and Smith's (2003) extended model. Ellis and Barkhuizen (2005) consider interactional analysis as a particular kind of discourse analysis which is "concerned only with dialogic discourse (i.e., discourse that involves two or more participants communicating with each other)" (p. 166). For the purposes of the current study, interactional analysis will serve as "a tool for identifying those properties of interactions that have been hypothesized to contribute to L2 acquisition" (Ellis & Barkhuizen, 2005, p. 166).

To answer the first research question, I identified the negotiation episodes in the chat conversations using interactional analysis method. I used a theory-driven approach (vs. data driven approach) using the Interaction Hypothesis as a theoretical framework. I followed the steps outlined by Ellis and Barkhuizen (2005) to analyze the data:

1. Defining the object of the inquiry;
2. Identifying instances of the object of the inquiry in the data;
3. Establishing a descriptive framework for analyzing the object of the enquiry; and
4. Quantifying instances of the categories. (p. 181)

After identifying the negotiated items, I quantified all instances of negotiation of meaning around the target vocabulary items. I calculated the posttest scores for the negotiated items for all participants. I calculated the posttest scores using the following procedure: Only the items that students marked as unknown on the pretest were taken into consideration for the posttests. For the receptive vocabulary tests, students' answers were counted as correct or incorrect looking at the letter they entered next to the text of the matching target vocabulary item on the answer sheet. The productive test scores were calculated in the same way but with one difference. A partial scoring rubric was used to evaluate students' answers [adapted by Smith (2004) from Barcroft (2002)]. Since some misspellings were likely to occur in students' answers, lower scores were expected for the results of this type of tests. The target vocabulary items were given a score between 0 and 1.

Negotiation referred to the episodes where language learners inquired the meaning of the target vocabulary item. *Preemptive input* indicated that prospective teachers provided the language learners with the meaning of the target vocabulary items by assuming that language learners did not know it. *Ignored* referred to target vocabulary items around which there was no negotiation of meaning although those items had been

marked as *unknown* in the pretest by the language learners. If target vocabulary items were not used at all in the online conversation, they were also coded as *ignored*.

In order to determine whether negotiation helped language learners' subsequent ability to recognize and produce target vocabulary items, the total posttest score for all the items negotiated was calculated by dividing the total score by the number of target vocabulary items for the French and Russian group. To determine whether the posttest scores held up over time, a Kruskal-Wallis test was conducted with a posttest score as the dependent variable and posttest type as the independent variable.

Findings and Results

The data collected through a range of instruments and analyses of this set of data both qualitatively and quantitatively have provided satisfactory answers for the research questions inquired in this study. Analysis of the chat scripts and language learners' pretest and posttest scores allowed me to answer the research questions.

The first research question was, "Does negotiation of meaning in synchronous computer-mediated communication facilitate college-level language learners' subsequent ability to recognize and produce new vocabulary?" Negotiation of meaning in synchronous computer-mediated communication facilitated language learners' ability to recognize and produce new vocabulary. The first research question was answered using descriptive statistics. The total number of subjects in this analysis was 11, because it was only the language learners who took the posttests. Prospective teachers did not take any tests since they were the native or more competent speakers of the target language.

Each student was tested for a total of 36 vocabulary items, excluding the distractors. According to the pretest results, there were 233 instances where a vocabulary item was unknown to the learners in both groups. It is important to note here that learners held some items in their task description sheets (with an image provided) in some of the tasks, and those items were considered "known" as well even if they were marked "unknown" in the pretest; therefore, they were excluded from the analysis. Out of those 233 vocabulary items, 79 were negotiated, whereas 147 items were ignored by the learners. In total, there were only seven instances where preemptive input was provided, only one of which was in the Russian group. The results suggest that almost all of the language learners ignored more items than they negotiated.

The total number of *on-task* turns was 2,332. There were a total of 151 negotiation episodes (79 around target vocabulary items and 72 around other vocabulary items), which corresponded to 791 turns. This shows that prospective teachers and language learners were involved in negotiated interaction in more than one-third of all turns. A similar percentage was found by both Pellettieri (2000) and Smith (2004).

For the descriptive statistics, initially the total posttest score for each student per session for each type of posttest was calculated, and then the mean score for all six sessions per student was calculated. Lastly, the mean score for all students for each type of posttest was computed. As seen in Table 1, language learners' posttest scores

for the negotiated items were quite high (close to 1) for the immediate and productive receptive tests. The scores were relatively lower for the productive tests. From the analysis of the chat scripts, it was also found that the number of ignored items was higher than the number of negotiated items. Although language learners marked the vocabulary items as "unknown" in the pretest, they did not ask the prospective teachers the meaning of those items and most of those ignored items were coded as ignored because they never occurred in the conversations.

From the results of the descriptive statistics, it can be said that language learners in both French and Russian groups were able to understand the meaning of the previously unknown vocabulary items and produce those vocabulary items after completing online tasks with prospective teachers. As expected, scores for productive tests were lower than the receptive ones for both groups. The lowest mean score was for the delayed productive posttest for both groups. The scores for the delayed posttests (receptive and productive) were much lower than the ones in Smith's (2004) study. This seems to have resulted from the fact that in the current study the delayed posttests were administered two weeks after the chat sessions instead of one week.

Table 1

Descriptive Statistics for the Negotiated Items for both Groups

Group	Posttest	# of negotiated items	# of students	Mean Score	SD
FRENCH	Immediate Receptive	54	8	0.8619	0.088
	Immediate Productive		8	0.5520	0.181
	Delayed Receptive		8	0.7630	0.133
	Delayed Productive		8	0.2387	0.160
RUSSIAN	Immediate Receptive	25	3	0.8857	0.000
	Immediate Productive		3	0.4722	0.043
	Delayed Receptive		3	0.8190	0.192
	Delayed Productive		3	0.1563	0.170

In order to answer the second research question, that is to find out whether posttest scores held up over time or not, a Kruskall-Wallis test was conducted with the test type being the independent variable and the posttest score dependent variable. For this analysis, items with score "0" in both of the immediate posttests (receptive and productive) were excluded from the data. The rationale for this decision was to have a better idea about whether the learned vocabulary items were *retained* by the learners or not. For example, if the learner scored "0" for a target vocabulary item in the immediate posttests, it would be impossible to examine whether the item was retained or not. In line with this consideration, six items in the French group and four items in the Russian group were excluded from the analysis. Only two of those items were scored "correct" in the delayed receptive tests and one

of them in the productive test. These instances can be related to *learning* outside of the CMC task rather than *retention* of what was learned during the task during the two-week period between the immediate and delayed posttests.

The results of the Kruskal-Wallis test showed that there was a significant difference between the four posttest scores for the French and Russian groups both ($p < .025$). This suggested that posttest scores did not hold up over time. To consolidate those findings, a univariate Kruskal-Wallis test was also conducted for the whole group with posttest score being the dependent variable and test type, class, and student independent variables. There was no statistically significant difference between students or classes (French and Russian) for all tests. Thus, a Kruskal-Wallis test was conducted for the whole group ($n = 11$) using only the test type as independent variable and results of this test are reported in Table 2. The results suggested that posttest scores did not hold up over a two-week period for either of the groups.

Table 2

Comparison of Posttest Scores for the Negotiated Items for both Groups

Test	# of students	Score Sum	Score Mean	(Mean-Mean0)/Std0
Immediate Receptive	11	395.000	35.9545	4.085
Immediate Productive	11	196.000	17.8182	-1.412
Delayed Receptive	11	329.000	29.9091	2.243
Delayed Productive	11	69.000	6.3182	-4.916

1-way Test, Chi-Square Approximation

Chi-Square	DF	Prob>Chi-Square
36.1703	3	<.0001*

Again, Wilcoxon signed rank test was conducted for each pair of tests (immediate receptive and delayed receptive/immediate productive and delayed productive). There was no statistically significant difference between either the two receptive posttests or the two productive posttests which suggested again that posttest scores did not hold up over the two-week period for either of the groups.

Discussion

This study has shown that negotiation of meaning in synchronous computer-mediated communication environment between language learners of French and Russian and prospective teachers, was likely to increase language learners' ability to understand and produce new vocabulary items based on their posttest scores after the online chat sessions. This finding provided further support for the Interaction

Hypothesis, which posits that negotiation of meaning facilitates second language acquisition. Interlocutors modify their language when a communication breakdown occurs in order to maintain the flow of the conversation. This modification process and efforts to convey the meaning through negotiation are likely to create opportunities for potential learning. In "technology-mediated tasks, the value posited for interaction might be expressed as a means of getting better input, for receiving the assistance needed to advance in knowledge and understanding, and for activating deep processing of input" (Chapelle, 2003, p. 56). Although positive evidence was found to support the value of negotiation of meaning in vocabulary acquisition, the ability to produce new vocabulary items did not hold up over a two-week period. This finding was different from what Smith (2004) found, due to a one-week longer period of time between the immediate and delayed posttests. Smith had conducted the delayed posttests a week after the immediate tests.

During the two-week period, language learners received no further instruction on the target vocabulary items since there was no review of the sessions. Nation (2007) emphasized that "there should be repeated opportunities for increasingly spaced retrieval of each word [and] later meetings with a word are more important than the initial presentation and teaching may be more useful then." In this case, it can be argued that whether it is one-week or two-week or even more delay between immediate and delayed posttests, it would be hard to expect language learners to retain the vocabulary items that they have encountered just a few times in a 30-minute online conversation. Moreover, the FL-SL (foreign language–second language) distinction needs to be taken into consideration while comparing language learners' ability to *retain* the newly learned vocabulary. In an FL environment, language learners are not exposed to the target language outside the classroom.

The analysis of chat scripts showed that the number of negotiated items was less than the number of items ignored. Half of those ignored items for the French group and almost all of the ignored items for the Russian group never even occurred in the conversation. This seemed to be partly due to time pressure and partly to the fact that neither the prospective teachers nor the language learners considered the items to be essential in completing the tasks. Task design and administration of the tasks might be an important factor to consider as a reason for the high number of ignored items. For example, specific instructions can be added to the task descriptions for the prospective teachers suggesting they use as many target linguistic items as possible in their conversations with the language learner. This, of course, would attribute more of a teacher role than a chat partner to the prospective teachers but probably increase the input that the language learners would get in those chat conversations. Similarly, language learners could also be encouraged to request assistance as much as they can by reminding them that this kind of activity is intended to help them increase their vocabulary.

Comparison of posttest scores for the negotiated items versus ignored items showed that students' ability to understand and produce ignored vocabulary items

after the task was significantly lower. This finding provided further evidence that supports the Interaction Hypothesis, which advocates that negotiation of meaning facilitates second language acquisition.

Conclusion

Overall, the online communication experience proved to be a positive component that can be integrated into language learning and teaching contexts. This finding is based on the analyses of both qualitative and quantitative data collected through various instruments some of which were not included in this study due to space limitations (e.g., reflections and surveys) from the participants.

Empirical support for the Interaction Hypothesis was provided through the findings of this study. Through negotiating meaning with prospective teachers in synchronous computer-mediated communication activities, intermediate-level learners of French and Russian were able to understand and produce newly encountered vocabulary items after those activities. However, unlike in Smith's study (2004), this ability did not hold up over a two-week period during which language learners were not exposed to any review of the newly learned vocabulary items.

One can argue that a review of newly learned vocabulary items at the beginning of subsequent sessions, as suggested by prospective teachers, would enable language learners to understand and produce those vocabulary items two weeks after the chat sessions, especially in an FL setting where language learners are not exposed to the target language outside of the classroom. In the design of similar online activities in the future, a certain amount of time can be allocated to the review of the previous week's tasks. As Nation (2007) underlined, opportunities for later meetings with the target vocabulary items should be created so that teaching could then be useful. Integrated into language curriculum rather than being an add-on component, such online activities could be enhanced through embedding further revision of the newly learned vocabulary items into the design process.

Prior to this study, research had indicated that online communication activities between NNS-NNS or NS-NNS were likely to facilitate second language acquisition (e.g., Blake, 2000; Blake & Zyzik, 2003; Pellettieri, 2000; Smith, 2004; Toyoda & Harrison, 2002). However, only a few had focused on interaction between language learners and prospective teachers. In this sense, the current study offers insights as to how such experiences are likely to benefit both language learners and prospective teachers.

The activities presented in this study could be customized to focus on various aspects of the language such as grammar, pragmatics, culture of the target language, and orthography. Organizing and monitoring such activities would require much work at the start. Building bridges between campuses around the world is difficult but possible. Once such connections are created and collaboration in teacher

education and language teaching departments is established, integrating similar activities into the curricula would be quite feasible.

In summary, the findings of this study provide useful, practical information for the field of language learning and teaching. The study tested the Interaction Hypothesis and provided further evidence for the link between this commonly used framework and second language acquisition, vocabulary acquisition in particular. The similar task design, testing, and data analysis procedures used in previous research studies (e.g., Smith, 2004) allow comparing the results of this study and making more informative conclusions. Finally, similar collaborative projects can be designed for language learners and prospective language teachers so that both parties benefit from such experience in different but closely-related ways.

Limitations to the Study and Suggestions for Further Research

Although prospective teachers were extremely helpful and supportive so that the research project could proceed smoothly, it would be quite helpful to have coordinators in both locations to make sure that all procedures are completed successfully. However, the urge to have control over those contexts would also make prospective teachers' participation impracticable since their participation was completely on a voluntary basis, and they were told to be free to connect to the Internet in their most convenient way. Yet, if such projects were mandatory components of the language teachers' program, such coordination would be much easier. As Blake (2006) emphasized, "Students must feel that their work is part of the normal curriculum—not extra credit—and will be reviewed and rewarded as such" (p. 245). This, of course, would increase the motivation for both prospective teachers and language learners to a great extent.

This study relied primarily on the chat scripts in the analysis of interactions between language learners and prospective teachers. Undeniably, there is more to online chat conversations such as mimics, gestures, and tracking of keystrokes which could be captured through the use of usability lab technologies. Since this research study was conducted on a voluntary basis without any financial support from any institution, it was not possible to set up such a usability lab. Furthermore, the geographical distance between the prospective teachers and me and the lack of a second coordinator in Canada, or in Russia, made it impossible to record the video, audio, and screen capture for the SCMC sessions on both sides. Even though it was possible to have audio-video conversations, I preferred to use only written messages to be able to implement the communicative tasks which were more likely to promote negotiation between chat partners.

Although the conclusions of this study are derived from various data sources and analysis methods with the aim of supplementing the validity of the results, the inter-rater reliability was not assessed for the coding of negotiation episodes. This was partly due to unavailability of a second rater who would speak English, French, and

Russian at the same time, and who would have some background in language teaching in the context where the study was conducted.

Further research could be conducted with the focus on various aspects of the target language such as grammar, pragmatics, and phonology/graphology. Also, giving more time for chatting would also allow language learners and prospective teachers to have a warm-up period at the beginning of each session and extend their conversations to related topics at the end of each task, adding much more authenticity to the experience.

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Bilgisayar Aracılığıyla Eşzamanlı İletişimde İkinci Dil Sözcük Edinimi

Öz

Problem Durumu: Hızlı internet bağlantısı ve diğer taşınabilir teknolojiler sayesinde günümüzde iletişim çok kolaylaşmıştır. Teknolojinin, eğitsel amaçlar göz önünde bulundurularak kullanıldığında, eğitime değerli katkılar sağlayacağı yönünde bulgular gittikçe artmaktadır. Bilgisayarda eşzamanlı iletişim araçlarıyla dil öğretim uygulamaları genişletilmekte ve bu araçların öğrenim için sağladığı yararlar yabancı dil eğitmenleri tarafından yaygın olarak kabul edilmektedir. İnternet üzerinden eşzamanlı iletişim araçları sayesinde yabancı dil öğrencileri bu dili ana dili olarak konuşanlarla etkileşim içerisine girip hedef dili kullanabilme ve dil yeteneğini geliştirme olanağına sahiptir. Bilgisayar destekli dil öğrenimi alanında yapılan araştırma çalışmalarının sadece bir kısmı eşzamanlı iletişim ortamlarındaki etkileşim ve ikinci dil sözcük edinimi arasındaki bağı destekleyen deneysel kanıt sağlamaktadır.

Araştırmanın Amacı: Çalışma, bilgisayar destekli dil öğrenimi alanında Etkileşim Varsayımını destekleyecek ek deneysel kanıtlar sunmayı amaçlamaktadır. Bu doğrultuda, ikinci dil ediniminin önemli bir parçası olan sözcük edinimine odaklanılmıştır. Araştırmanın yanıt aradığı sorular aşağıdaki gibidir:

1. Bilgisayar aracılığıyla eşzamanlı iletişimde Rusça ve Fransızca yabancı dil öğrencilerinin bu dillerin öğretmen adayları ile bilinmeyen sözcükler etrafında yaptıkları anlam görüşmeleri öğrencilerin bu yeni sözcükleri tanıma ve kullanma yeteneğine katkıda bulunmakta mıdır?
2. Öğrencilerin sözcük bilgisinde gözlenen farklılıklar iki haftalık bir zaman içinde değişikliğe uğramakta mıdır?

Araştırmanın Yöntemi : Bu yarı-deneysel çalışmada, orta düzey Fransızca ve Rusça sınıfından on bir üniversite öğrencisi bu dillerin öğretmen adayları ile altı hafta boyunca otuzar dakikalık çevrimiçi sohbet oturumları gerçekleştirmişlerdir. Öğrenciler öğrendikleri dilin konuşulduğu bağlamın dışında olan Amerika Birleşik Devletleri'nden, öğretmen adayları ise bu dillerin resmi dil olarak konuşulduğu Quebéc, Kanada ve St. Petersburg, Rusya'daki eğitim kurumlarından bu oturumlara katılmışlardır. Her bir öğrencinin bir öğretmen adayıyla altı hafta boyunca çeşitli iletişimsel ödevleri yazılı iletiler aracılığıyla tamamladığı bu sohbet oturumları araştırmacının gözetiminde gerçekleşmiş ve arşivlenmiştir. Karma-yöntem kullanılarak hem nitel hem de nicel veriler çözümlemeye dahil edilmiştir. Sohbet metinleri etkileşimsel çözümleme yöntemi ile çözümlenmiştir. Öğrencilerin daha önceden "bilinmeyen" olarak işaretlediği sözcükler etrafında sohbet esnasında yapılan görüşme bölümleri her sohbet oturumu

için tek tek tespit edilmiştir. Öğrencilerin ön test, ardıl test ve gecikmeli ardıl test puanları tanımlayıcı ve çıkarımsal istatistik yöntemleri kullanılarak çözümlenmiştir.

Araştırmanın Bulguları : Dil öğrencileri ve öğretmen adayları bilgisayar ortamında iletişimsel ödevleri tamamlarken bilinmeyen sözcükleri anlayabilmek amacıyla anlam görüşmesinde bulunmuşlardır. Öğretmen adayları bu oturumlarda daha yetkin eş rolünde olmuşlardır. Çalışma, bilgisayar aracılığıyla eşzamanlı iletişimin ikinci dil sözcük edinimine olumlu katkısı olduğu yönünde kanıt sunmaktadır. Hem Fransızca hem de Rusça öğrencileri çevrimiçi ödevleri tamamladıktan sonra daha önce anlamını bilmedikleri sözcükleri büyük ölçüde tanımış ve üretebilmişlerdir. Bunu da söz konusu ödevleri tamamlarken öğretmen adayları ile bu sözcüklerin anlamını görüşerek yapmışlardır. Her bir ödev içerisine serpiştirilen kilit sözcükler görüşüldüğü takdirde öğrenciler tarafından öğrenilmiştir.

Öğrenciler ve öğretmen adayları verilen ödevlerin konusuna yönelik tüm sohbet oturumlarında 2332 kez söz almışlardır. Yetmiş dokuzu testlerde hedeflenen sözcükler ve 72'si diğer sözcükler etrafında olmak üzere toplam 151 görüşme bölümü tespit edilmiştir ve bu da 791 söz hakkına denk düşmektedir. Sonuç olarak katılımcılar her üç söz hakkından birini hedef sözcükleri "görüşmek" için kullanmışlardır. Öğretmen adayları öğrenciler için bilinmeyen sözcükleri açıklamış ve ödevlerin tamamlanmasında büyük rol oynamışlardır.

Ancak, gecikmeli ardıl testlerin sonuçlarının çözümlemesi sonucunda Fransızca ve Rusça öğrencileri tek bir grup olarak ele alındığında öğrenilen yeni sözcüklerin çevrimiçi sohbet oturumlarından iki hafta sonra hatırlanmadığı ortaya çıkmıştır. Araştırmanın diğer bir önemli bulgusu da daha önceden öğrenciler tarafından "bilinmeyen" olarak işaretlenmesine rağmen sohbet yazışmalarında hiç kullanılmayan sözcüklerin sayısının çokluğu olmuştur.

Araştırmanın Sonuçları ve Önerileri: Genel olarak, çevrimiçi iletişim deneyimi yabancı dil öğrenimi ve öğretimi bağlamlarına dahil edilebilecek olumlu bir bileşen olduğunu bu araştırmayla bir kez daha kanıtlamıştır. Bu çalışmanın bulguları Etkileşim Varsayımını deneysel olarak destekler nitelikte olmuştur. Yeni öğrenilen sözcüklerin sohbet oturumlarından iki hafta sonra öğrenciler tarafından hatırlanmaması bu tür deneyimlerde yapılacak değişiklikler konusunda bize yol göstermektedir. Yabancı dil müfredatına eklenen bir bileşen olmaktan çok müfredatın temel bir parçası haline gelmesi durumunda bu tür çevrimiçi etkinlikler tasarım sürecine yeni öğrenilen sözcüklerin bir sonraki oturum öncesi tekrar gözden geçirilmesiyle geliştirilebilir. Öğrencilerin tüm sözcükleri etkili bir şekilde kullanabilmesi ve bu sayede öğrenebilmesi açısından sohbet oturumları için daha fazla süre tanınabilir.

Gelecekte bu alanda yapılacak araştırma çalışmalarında mimikler, beden hareketleri, klavye vuruşları teknolojik donanımı daha yüksek (ekran kamerası, göz kamerası, v.b.) bir laboraturda kaydedilebilir ve çözümleme için veri kaynaklarını artırabilir. Teknik kısıtlamalardan dolayı bu tür veriler bu çalışmaya dahil edilememiştir. Gelecekte, hedef dilin dilbilgisi veya pragmatik (kibarlık, özür dilemeler, v.b.) gibi farklı yönlerine odaklanarak çalışmalar yapılabilir. Ayrıca, sesli ve görüntülü sohbet oturumları düzenleyerek bu tür deneyimlerin kapsamı genişletilebilir ve sözcük bilgisinin ötesinde dil becerilerine ağırlık verilebilir. Bu tür projelerin gerçekleştirilebilmesi için dünyanın çeşitli ülkelerindeki üniversiteler arasındaki işbirliğinin geliştirilmesi önerilmektedir. Bu çalışmanın bulguları bu tür internet üzerinden yapılan etkinliklerin yabancı dil müfredatına eklenmesi gerekliliğini güçlendirmektedir.

Anahtar Sözcükler: Bilgisayar aracılığıyla iletişim, bilgisayar destekli dil öğrenimi, yabancı dil öğrenimi, ikinci dil sözcük edinimi, Etkileşim Varsayımı, teknoloji.

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Research and Trends in Computer-assisted Language Learning during 1990–2008: Results of a Citation Analysis

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Abstract

Problem Statement: In a search of available literature, there wasn't any articles found that are related to computer-assisted language learning (CALL) on content analysis or citation analysis. This reveals that there was a research gap for citation analysis in the field of CALL. Therefore, there's a necessity for citation analysis in the field of CALL to examine the trends of analysis, research and citation.

Purpose of Study: The purpose of this study was to examine research and trends in CALL published in selected professional * documents during 1990-2008.

Methods: Citation analysis was used in this study to investigate documents related to CALL that are indexed by the *Web of Science*, *Scopus EBSCOhost* and *ScienceDirect.* "Computer-assisted language learning," "computer-assisted language instruction," "computer-aided language learning," "CALL," "technology-assisted language learning," etc. were the keywords used in searching for documents. There were a total of 1309 documents analyzed that were judged to be relevant to the field of computer-assisted language learning. Descriptive statistics were used to analyze and report this data.

Findings and Results: The principal documents related to CALL published in the sources during 1990–2008 were *articles* and *English* was the most frequently-used language. The most frequent publishers of documents related to the CALL field were *Computer-assisted Language Learning* and *Language Learning and Technology* journals. Interestingly, the number of published documents increased sharply to a high level in 1997, as compared to the previous year. The majority of the source documents which were related to CALL were co-authored. *Speech and Learning Systems* were the most frequently used keywords. A total of 3536 cited documents were related to CALL during the years 1990-2008 by the authors. The most

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frequently-cited article topic was "conversation/computer-mediated communication," and descriptive research was used most frequently in research design.
Conclusions and Recommendations: The trend line is an increasing trend in the number of articles on CALL starting from the year 2000. It was recommended that a combination of citation analysis and other analysis types should be used in future research studies. It was also recommended that similar studies should be conducted with the journal and should be repeated at least every five years.
***Keywords*:** Computer-assisted language learning, citation analysis, research, trends, h-index

Since 1995, the World Wide Web (WWW) and related communication and information technologies have permitted unprecedented access to information and resources surrounding the teaching-learning process. However, information technologies are not solely responsible for the effective instruction and learning in educational environments. To increase the effectiveness of instruction, instructional technologies should be used appropriately and effectively (Akbaba–Altun & Gürer, 2008; Uzunboylu, 2006).

Under the influence of the use of instructional technology in language instruction, computer-assisted language learning (CALL) has been shaped and developed since the 1960s, and, by the 1980s, it had become a rapidly expanding field (Ahmad, Corbett, Rogers & Sussex, 1985; Higgins & Johns, 1984). CALL originates from CAI (Computer-Assisted Instruction). The philosophy of CAI or CALL is that the lessons should allow the learners to learn on their own using structured and/or unstructured interactive lessons. These lessons carry two important features: bidirectional (interactive) learning and individualized learning. CALL is not a method. It is a tool that helps teachers to facilitate the language learning process. CALL can be used to reinforce what has been learned in the classrooms. It can also be used as remedial to help learners with limited language proficiency. Even though CALL has also been known by several other terms such as technology-enhanced language learning (TELL), computer-assisted language instruction (CALI), and computer-aided language learning, the field is the same.

Content analysis and citation analysis of published articles in academic journals has been conducted in a variety of professional fields such as psychology, geography, science education, instructional technology, etc. For example, in the field of psychology, Howard, Cole, and Maxwell (1987) and Smith et al. (1998) reviewed the research papers published in selected American Psychological Association (APA) journals. Eybe and Schmidt (2001) and Tsai and Wen (2005) examined research papers from various science education journals. Aylward et al. (2008) investigated to identify the top 100 most frequently-cited ''classic'' articles in the *Journal of Pediatric Psychology* from 1976 to 2006. In the literature search, there hasn't been any article found related to CALL on content analysis or citation analysis. For all that, publications appear periodically that identify and discuss patterns and trends in instructional technology (e.g., Dempsey, 2007; Ely, 2002; Gall et al., 1999; Hew &

Kale, 2007; Klein, 1997; Maushak &, Price, & Wang 2000), which (instructional technology) is nearly CALL field. Briefly, all studies analyzed conducted a journal-based content analysis, not the documents-based citation analysis conducted hitherto.

Brown and Gardner (1985) explain that citation analysis has been used in the social sciences for investigating the research contributions of individuals, institutions, and professional journals. Aylward et al. (2008) concluded that citation analysis, while potentially useful in identifying documents with a large number of citations in a given journal, should also be an indicator of any article's complete influence on a given field. In addition, citation analysis permits researchers to examine how frequently a work has been cited by other authors, one measure of the influence of a writer or of a particular writing. The use of citation analysis as a research tool began during the mid-1950s when Garfield (1955) proposed citation indexing. With the introduction of the *Social Sciences Citation Index (SSCI), Science Citation Index–Expanded (SCIE),* the *Arts and Humanities Citation Index (AHCI)*, and the Institute for Scientific Information (now Thomson Scientific), systematic analysis began of research trends and the influence of scholarly works. A few researchers in recent years have also looked at various aspects of CALL research by doing reviews or meta-studies of collections of papers either as separate articles (Debski, 2003; Hubbard, 2005; Felix, 2005; Hoven, 2004; Levy, 2002; Son, 1998; Zhao, 2003) or as parts of larger works (Chapelle, 2001; Levy & Stockwell, 2006). These are particularly important as they illuminate trends that are missing from individual studies or even edited volumes and special-theme issues of CALL oriented journals.

The framework of the found information related to instructional technology or other fields which were explained above, content analyses or journal-based citation analyses which have been done by the researchers show that document-based citation analysis studies haven't been researched by CALL thus far. This reveals that there was a research gap for citation analysis in the CALL field. Therefore, in the field of CALL, there's a necessity for citation analysis to put forward the trends of analysis, research and citation.

The purpose of this study was to examine research and trends in CALL published in selected professional documents during 1990-2008. Aspects of publications examined were document types, the language of documents, documents from the sources, years of publication, authors, the most frequently-used keywords, citation by the years and the mostly frequently-cited documents.

Method

Citation analysis was used in this study to investigate documents related to CALL that are indexed by the *Web of Science*, *Scopus, EBSCOhost* and *ScienceDirect* (see in image 1). Using the keywords "computer-assisted language learning," "computer-assisted language instruction," "computer-aided language learning", "CALL," "technology-assisted language learning," etc. to search documents published and indexed in the *Web of Science*, *Scopus, ScienceDirect* and *EBSCOhost*

during 1996-2008, a total of 1358 documents were found (June 29, 2008). Based on these documents, citation analysis was carried out using article abstracts and publication information indexed in the *Web of Science*, *Scopus, ScienceDirect* and *EBSCOhost*. In cases in which the publication information was insufficient or missing from the *Web of Science*, *Scopus ScienceDirect* and *EBSCOhost* the researchers used the complete documents for analysis. The selection of documents was processed by two doctoral researchers in educational technology and two doctoral researchers in English Language Teaching and further validated by an associate professor in the field. This procedure identified 1309 documents that were judged to be relevant to the field of CALL.

Documents identified were analyzed according to the document types, the language of the documents, documents from the sources, years of publication, authors, the most frequently-used keywords, citation by the years and the mostly frequently-cited documents. All of the keywords from each document in selected databases were classified and accumulated from the years 1990 to 2008. These keywords can also be used to show trends in the field of CALL. Trend lines help researchers to be able to understand their own field, which years the researches were made, according to the interested area the widespread of citations and acknowledge the relationship together with the increase of the interested area field that plays an important role. Trend lines provide the number of citations received in that year, regardless of the publication date of the cited document, divided by the total number of documents published in that year. This formula to calculate trend lines was used by the Scopus (2008).

In addition, the most frequently-cited documents were analyzed according to cited authors, focus, subject area, self or no-self cited. Hirsch (2005) has used the notion of citation analysis to develop a means for ranking the research output of academicians within disciplines based upon the number of papers published and the number of times each paper is cited in the professional literature. According to Hirsch, "A scientist has index h if h of his or her N_p papers [number of papers] have at least h citations each and the other (N_p – h) papers have $\leq h$ citations each" (p. 16569); Gill (2006) provided this example. The academician who writes 50 papers has an h index of 20 if 20 papers have been cited by other authors, and each of the remaining 30 papers has been cited fewer than 20 times. In other words, an author with very few high-impact papers or, alternatively, many low-impact papers will have a weak h-index. Crudely put, the h-index helps us distinguish between a one-hit wonder and an enduring performer. Also, the h index documents were analyzed on the basis of content analysis (topic and research design) methodology. Descriptive statistics were used to analyze and report this data.

Findings and Results

Overall CALL Documents Analysis

***Document types*:** The principal documents published in the sources during 1990–2008 were articles related to CALL (n = 998, 76.24%). Three-hundred and five conference papers (n = 114, 8.71%) and reviews (n = 68, 5.19%), book reviews (n = 52,

3.97%), editorials (*n* = 48, 3.67%), and software reviews (*n* = 23, 5.19%) accounted for 23.3% of the sources' literary content. The remaining documents (letter (*n* = 3), conference reviews (*n* = 1). bibliography (*n* = 1) and the notes (*n* = 1) published accounted for less than 1% of the total document types.

***Document's language*:** English was the most frequently-used language in journals related to CALL during 1990–2008 (*n* = 1301, 99.39%). The remaining documents published accounted for less than 1% of the total document language. Two documents were published in Chinese, 2 documents were published in French, 1 document was published in Spanish, 1 document was published in Japanese, 1 document was published in Russian and 1 document was published in German.

Table 1

Number of Published Documents by the Sources

Rank	Title of Source	*N*	Percentage of Total Articles
1	Computer-assisted Language Learning	729	55.69
2	Language Learning and Technology	256	19.56
3	System	26	1.99
4	Computers and Education	23	1.76
5	Lecture Notes in Computer Science Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics	12	0.92
5	Foreign Language Annals	12	0.92
6	Journal of Educational Computing Research	9	0.69
7	HISPANIA	8	0.61
7	Modern Language Journal	8	0.61
7	TESOL Quarterly	8	0.61
8	Language Learning	7	0.53
8	Canadian Modern Language Review	7	0.53
9	Journal of Computer-assisted Learning	6	0.46
10	British Journal of Educational Technology	5	0.38
10	Computers And The Humanities	5	0.38
10	Educational Technology and Society	5	0.38
10	Simulation & Gaming	5	0.38
10	User Modeling and User Adapted Interaction	5	0.38
	Total	1136	86.78
	Other sources total	173	13.22
	General total	1309	100.00

***Documents from the Sources*:** During 1990–2008, 1309 documents published related to the CALL field in the *Web of Science*, *Scopus, Science Direct* and *EBSCOhost* databases, constituted 100 percent of the documents published. The most frequent publishers of documents related to the CALL field were *Computer-assisted Language Learning* (*n* = 729, 55.69%), *Language Learning and Technology* (*n* = 256, 19.56%), *System Journal* (*n* = 26, 1.99%), and the *Computers & Education* (*n* = 23, 1.76%). Two-hundred and seventy-five (21.01%)

documents are found to be in the sources that published fewer than 12 documents. One-thousand and thirty-six (86.78%) documents were published in 18 sources, each publishing five or more documents (see in Table 1 above). The remaining documents published accounted for about 13.22% (n =173) of the total documents.

The years of publications: During 1990–2008, the number of documents published annually in sources which were related to CALL showed an increase, from 26 documents in 1990 to 46 documents in 2008 (see Figure 1). The lowest number of documents published was in 1992 (n = 20), the highest number of documents published was in 2005 (n = 118). The published documents, interestingly, increased sharply to a high level in 1997 (n = 96) compared to the previous year. Among the documents, 1041 (79.53%) have been published since 1997.

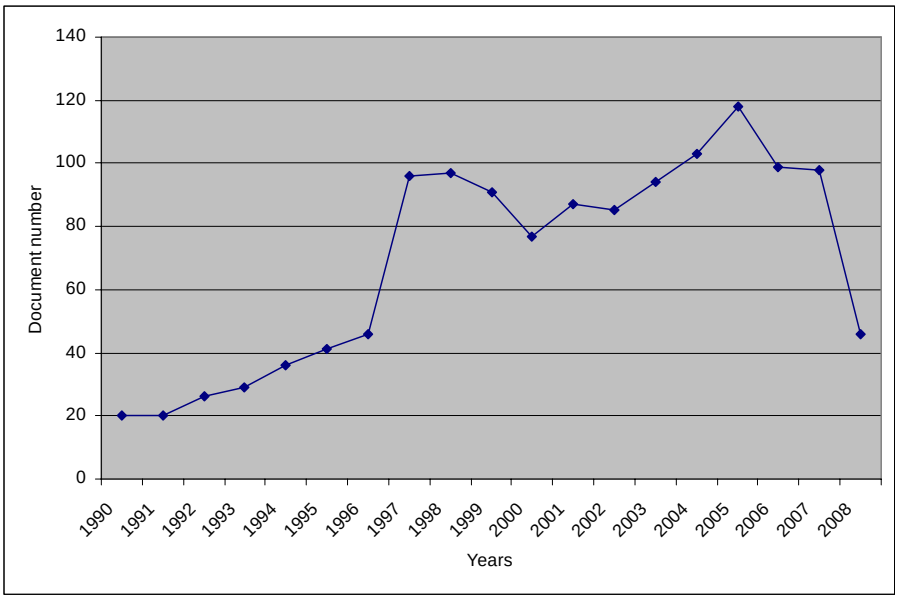

Figure 1. Number of published documents from 1990 to 2008

Documents by author: A total of 1673 authors published 1309 documents in sources indexed by the *Web of Science*, *Scopus ScienceDirect* and *EBSCOhost*. Authors who published four or more documents included Liou, H.C., (n = 13), Lang, C. (n = 9), Heift, T. (n = 6), Wible, D. (n = 5), Liu, J. (n = 5), Hegelheimer, V. (n = 5), Sakamoto, H. (n = 4), Virvou, M. (n = 4), Yang, S.C. (n = 4) and Zhao, Y. (n = 4). In addition to these authors, another 114 authors each wrote or co-wrote three documents, 214 authors each wrote or co-wrote two documents and the remaining authors each wrote or co-wrote one document. The majority of the sources documents which were related to CALL were co-authored.

***Most frequently-used keywords*:** The most often used keywords in these documents related to CALL are presented in Figure 1. Two-hundred and seventy-

four different keywords were used in documents related to CALL during 1990-2008 by the authors. *Speech* was the most frequently-used phrase (*n* = 147). *Learning systems* was the second most frequently-used phrase (*n* = 144). *Computer-assisted language learning* was the third most frequently-used phrase (*n* = 141). Figure 1 reveals an increase in the use of these keywords and phrases: websites (*n* = 94), human (*n* = 66), computer-aided instruction (*n* = 63), natural language processing systems (*n* = 57), intelligent tutoring systems (*n* = 54), human computer interaction (*n* = 51), information analysis (*n* = 51), gender (*n* = 45), distance education (*n* = 42), computer-supported collaborative learning (*n* = 39), database systems (*n* = 39), language teaching (*n* = 39), computer-mediated communication (*n* = 33), interactive learning environments (*n* = 33), computer software (*n* = 30), multimedia systems (*n* = 30) and error analysis (*n* = 21).

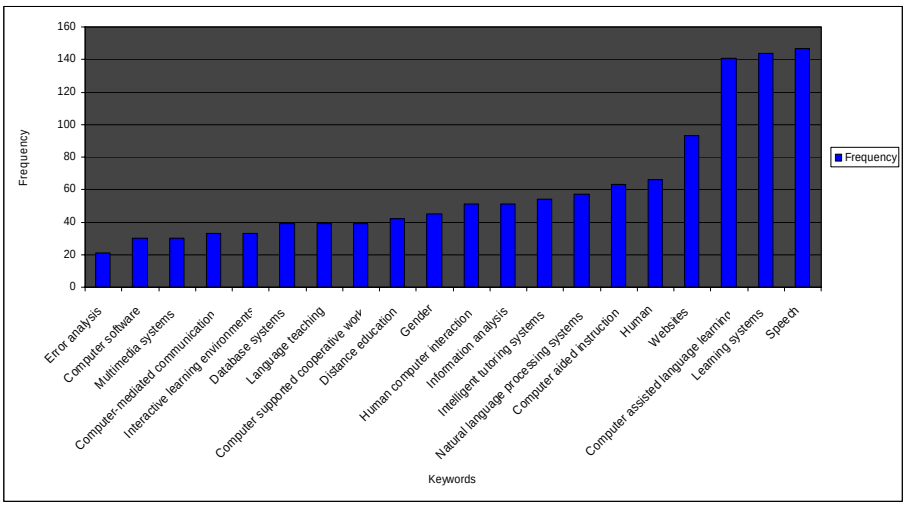

Figure 2. Number of most-used keywords from 1990 to 2008

***Citation by the years*:** The citation by the years in sources related to CALL can be seen in Figure 3. The graph shows the total 3536 cited in the documents related to CALL during the years 1990-2008 by the authors. It shows the low citation (*n* = 1) that occurred in 1991. The top citation occurred in 2007 (*n* = 934). More than half of the (*n* = 2699, 76.33%) citation occurred between the years 2005–2008. After year 2000, the citation number had an increase in an interesting way. The reason for this was the way information and communication technologies had become so widespread; the authors were easily able to access data research resources such as *ERIC*, *EBSCOhost*, *Scopus*, the *Web of Science*, etc.

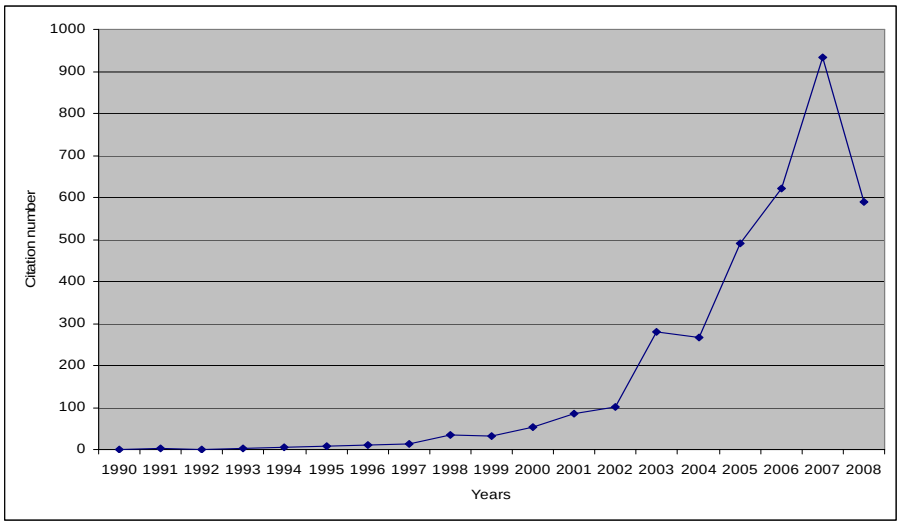

Figure 3. Number of citations according to the authors from 1990 to 2008

An Analysis of the Most Frequently-cited Articles

In order to identify articles of higher quality or impact, CALL-related documents were further analyzed by their citation counts in the *Web of Science* (as on July, 8, 2008). The *EBSCOhost* database was removed because it did not supply any citation data. Based upon the most frequently-cited articles in the *Web of Science*,–Table 2 identifies the 10 most frequently-cited articles and their authors published during 1990–2008 in the sources related to CALL. The citation counts of these 17 articles range from eight to 26. Shih, Feng and Tsai (2008) explained that "articles with more citation frequencies are usually those that are better recognized by others in related fields. They probably present more fundamental ideas about the issues for future research." The most frequently-cited articles analyzed research design, and the research topic was further analyzed in detail.

Table 2
The Most Frequently-cited Articles in the Web of Science

Rank	Study	Topic	Research Design	Total Cited	Mean Annual Citation
1	Computer-assisted classroom discussion in the foreign language classroom - conversation in slow motion. Beauvois, M.H., (1992), *Foreign Language Annals*, *25*(5) 455-464	Conversation/ Computer-mediated communication	Experimental	26	1.68
2	Artifacts and cultures-of-use in intercultural communication. Thorne, S.L. (2003). *Language Learning & Technology*, *7*(2) 38-67	Intercultural Computer-mediated communication	Descriptive	17	3.78
3	Extending the scope of the student model, Bull, S., Brna, P., & Pain H., (1995), *User Modeling And User-Adapted Interaction 5*(1), 45-65	Intelligent CALL Systems	Developmental	15	1.2
4	Understanding the "other side:" Intercultural learning in a Spanish English e-mail exchange. O'Dowd, R. (2003). *Language Learning & Technology 7*(2) 118-144	Intercultural learning	Descriptive	14	3.11
5	Linguistic perspectives on the development of intercultural competence in telecollaboration. Belz J.A., (2003) *Language Learning & Technology* 7(2) 68-67	Intercultural learning/competencies	Descriptive	12	2.67
6	Using native speakers in chat. Tudini, V., (2003). *Language Learning & Technology 7*(3) 141-159	Computer-mediated communication	Descriptive	11	2.44
7	Retention of word meanings inferred from context and sentence-level translations: Implications for the design of beginning-level CALL software Grace CA. (1998), *Modern Language Journal*, 8(24) 533-544	Retention / CALL	Descriptive	10	1.05
8	Does feedback enhance computer-assisted language learning? Vanderlinden, E., (1993), *Computers & Education*, *21*(1-2) 61-65	CALL / Feedback	Descriptive	10	0.69
9	Second language socialization in a bilingual chat room: Global and local considerations. Lam, W.S.E., (2004), *Language Learning & Technology*, *8*(3) 44-65	Language socialization / Computer-mediated communication	Descriptive	10	2.86
10	The naive lexical hypothesis - Evidence from computer-assisted language learning. Bland. S.K., Noblitt J.S., Armington S., & Gay, G. (1990) *Modern Language Journal, 74*(4) 440-450	Naive Lexical Hypothesis / CALL	Developmental	8	0.46

The most frequently-cited articles fall into the research categories of "conversation/computer-mediated communication" (Beauvois, 1992; *n* = 26), focusing on computer-assisted instruction, group discussion, higher education, local area networks, French, Portuguese, student participation, teacher student relationship, and uncommonly taught languages; other common research categories are "intelligent CALL systems" (Bull, Brna & Pain, 1995; *n* = 15), which focuses on student model, intelligent learning environment, reflection, learning strategies, analogy, and second language acquisition. These first rank and third rank cited articles were published before 1996. That is probably because articles that were published earlier have a greater chance of being accessed and cited by other related studies. However, there were three studies in 2003 about "intercultural learning/computer-mediated communication" (Thorne, *n* = 17; O'Dowd, *n* = 15; Belz, *n* = 12) that had a total of 44 citation counts in the *Web of Science*. Considering their year of publication and mean annual citations (see in Table 2), they are frequently-cited articles. This result also suggests that papers related to the topics of ''intercultural learning" and "computer-mediated communication" may address some fundamental issues in CALL, and therefore are most prevalent research topics in CALL. Also, most of the other frequently-cited articles were related to this topic.

Research design: In terms of the type of research design, these papers were classified into three major types; also the same classification was used by Shih, Feng and Tsai (2008). These are three major research types identified in the Handbook of Research for Educational Communication and Technology (Jonassen, 1996): Experimental research, which typically involved an experimental group and a control group to test hypotheses regarding certain treatments (Ross & Morrison, 1996); descriptive research, which gathered data from events or participants' responses to describe, explain, validate or explore a particular issue (Kunpfer & McLellan, 1996); developmental research, which systematically studied the design, development, and evaluation process of certain educational interventions (Richey & Nelson, 1996). The development of some CALL systems is also viewed in this type. The majority of most frequently-cited studies were classified as descriptive research (seven of the ten documents). The second ranked was developmental research (*n* = 2), and third ranked (*n* = 1) was experimental research method.

Conclusions and Recommendations

In this paper, the researchers have analyzed documents related to CALL that were published in sources from 1990 to 2008, by searching the *Web of Science*, *Scopus, EBSCOhost* and *ScienceDirect*. Citation analysis of papers revealed that 1309 documents published in the sources were related to CALL. Almost eighty-six percent of the documents were published in 18 sources, each source publishing five or more documents. On the other hand, *Computer-assisted Language Learning* journal was found to contribute the most to the CALL field, with a 55% publishing rate. Following this, *Language Learning and Technology* held a 20% publishing rate. This is actually an expected result. Since both journals' aims were to focus directly on the CALL field, they were published articles on the CALL field. In addition, having

researches on the CALL field in more than 191 sources is an indication that the CALL field has a wide span. This wide span is parallel with the information gathered about authors and subject areas.

Three of the four (76%) documents were articles; English (99%) was the most frequently used language in sources related to CALL. This result is similar to Nederhof (2006) studies that the *Web of Science* indexes documents that are predominantly in English (93–95%) with the remainder being shared between German (2–3%), French (1%) and other languages. However, for the past few years, education journals (e.g., *Eurasia Journal of Educational Research*, *Hacettepe University Journal of Education*, *Teoria De La Educacion*, *Education Science in Theory and Practice*) with different foreign languages (Turkish, German, Spanish, etc.) have been included in the *SSCI*, *SCIE* and *AHCI* index; this has resulted in an increase in the articles on CALL in different languages. For example, 25 journals have been listed in Thomson Reuters Master Journal List starting with the word *Turk* or *Turkish* (Thomson Reuters, 2008). This may be seen as an indication of the increase in the number of Turkish Scientific documents in the *Web of Science*. This increase will naturally be within the CALL field that enables interdisciplinary applications.

The number of published documents, interestingly, increased sharply to a high level in the years 1997 and 2005 compared to the previous years. The reason for this result should be researched. In addition, three or four of the documents related to CALL have been published since 1997. Possible reasons for this can involve the developments in technology or science. Thus researchers had the chance to access scientific documents more easily.

The top three authors were Hsien-Chin Liou (*National Tsing Hua University, Taiwan),* Catherine Lang *(University of Waikato, New Zeland)* and Trude Heift (*Simon Fraser University, Canada*). These authors are the leading and the most dominant scientists of the CALL field. The majority of the journal documents related to CALL was co-authored. Similar results were found by Kirby, Hoadley, & Carr-Chellman (2005). They found that almost 70% of the instructional system design and learning science documents were co-authored. In addition, Latchem (2006) also founded that 56% of *BJET* documents were co-authored. Based on these results, it can be implemented that there is a trend in articles on CALL in which the researches are based on a collaborative work of researches.

Anglin and Towers (1992) noted that authors could be cited for affecting a particular area of inquiry, a theory, innovative perspective, or research design, For example, the most frequently-cited articles (Beauvois,1992) in this review have addressed experimental design research and innovative use of CALL. The following terms were increasingly used from1990 to 2008: Speech, learning system, computer-assisted language learning, websites, human, computer-aided instruction, natural language processing systems, intelligent tutoring systems, human computer interaction, information analysis, gender, distance education, computer-supported collaborative learning, database systems, language teaching, computer mediated

communication, interactive learning environments, computer software, multimedia systems and error analysis.

The total number of citations related to call by the authors was 3536 during the years from 1990 to 2008 by the authors. The lowest citation occurred in 1991 and 1996, whereas the top citation occurred in 2007. More than half of the citations occurred–between the years of 2005–2008. Throughout the years, an increase in the CALL citations has been identified. This increase resulted from increasing availability of database like *ERIC, ScienceDirect, Scopus, EBSCOhost, Web of Science*, etc. The fact is that it has become easy for researchers to access them. The expectation of the numbers of documents and citations related to CALL will increase–year by year.

The ten most frequently-cited articles based upon the *most frequently-cited documents* were published during 1980–2007 in journals which were related to CALL. The most frequently-cited articles in this review have addressed "*conversation/computer-mediated communication*" by Margaret Healy Beauvois (1992). The vast majority of articles related to CALL presented in the hi-index were focused on *computer-mediated communication and ''intercultural learning.*" The majority of most frequently-cited articles studies were classified as descriptive research. The second ranked was developmental research, and the third ranked was experimental research design. This is a very interesting result; Ross and Morrison (1996) claimed that the experimental research has been a traditional research method in the field of studying learners' psychology-related issue. In this framework, we look at the topic of the *h* index document learning. It was expected that the researchers would use experimental research design with what they had researched. However, the end results look very interesting and should be investigation by the CALL researchers. There were only two developmental research designs used in *h* index documents. This also suggests that researchers who intend to study learners' learning psychology characteristics may be likely to utilize an experimental research design to gain better research outcomes. Furthermore, because descriptive research may combine qualitative and quantitative research design features, the complicated relationships between the different variables involved in a certain situation (Shih, Feng and Tsai, 2008) can be better described. Therefore, most CALL studies used this approach to investigate different sub domains of the field. The research design type of these 10 articles shows a valuable reference for researchers who may be interested in doing studies related to the CALL field.

Between the years of 1991 and 1992, the number of published articles and the number of citations were low according to the low trend, together with this in the year of 2008, the published articles prove that there was an increase in duplication. So, in the area of CALL, it has been noticed in the year of 2008 that there was an increase in both the number of articles and citation.

As can be seen from Figure 4, except for the year 2004, there is an increasing trend line in the number of documents on CALL starting from the year 2000.

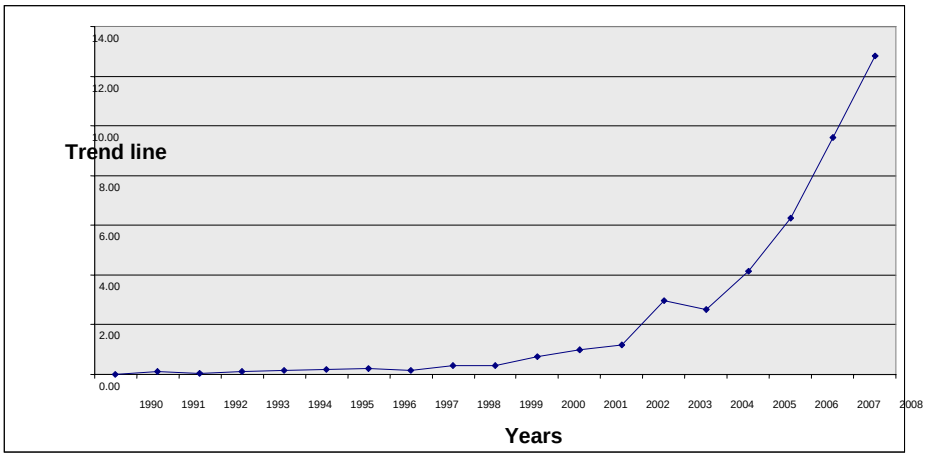

Figure 4. Citation trend line of CALL from 1990 to 2008

Although the nature of this study is particularly descriptive, it is hoped that the results can provide educators and researchers in the fields of CALL with some insightful ideas about the publishing trends of research studies in CALL-related sources. This type of citation analysis is also very beneficial for young scholars who are in the field (Tsai & Wen, 2005). The analysis can help them to not only identify contemporary research topics, methods and trends, but also to understand the influence and influencers in their major subjects (Gall et al., 2004). In addition, knowing the trends of recent research studies can help policymakers in related fields to make future plans in terms of these issues. The documents identified in the current study have contributed to important advances not only in the field of CALL or computer-assisted learning but in all of the other fields as well. With continued scholarly submissions to CALL journals, new citation analyses in the field will emerge and continue to impact the expanding field itself as well as other fields.

Although the present study offers a descriptive approach to identifying the CALL documents, some limitations should be noted. First, for example, citation analysis does not provide information regarding how or why a specific work was cited (Everett & Pecotich, 1993; Hoffman & Holbrook, 1993). Furthermore, the CALL impact of a given article cannot be measured in this manner. Although the CALL researchers could be using the information from a study in practice, this would not necessarily result in a citation of the article. Additionally, citation analysis can be limited by their ''snapshot'' approach in examining the citation impact of a given article; given a more suitable lag time since publication, it is likely that more recent articles would appear as hi-index. Despite these limitations, citation analysis provides a direct, objective, and reliable means of defining the documents in a field (Baltussen & Kindler, 2004; Terajima & Aneman, 2003). Although it looks like only a piece of the puzzle, the current findings highlight some of the influential works in the field of CALL, as it is reflected in the field's flagship publication. In addition to these, the current study highlights potential areas of future research. For example,

future studies could examine several issues, such as how the availability of research grant funding is; or how advances in the CALL models or increased use of more sophisticated statistical techniques affects the topics published within related journals, and, in turn, it effects how these aspects influence citation rates.

Although citation analysis was considered as one of the objective measurements of document evaluation, there were still some disadvantages with this method, such as negative citation, self citation, and gratuitous citation (Shih, Feng & Tsai, 2008; Chu, Hsu, & Yu, 1997). Therefore, it is suggested that a combination of citation analysis, together with other analysis types, should be used in future research studies in order to obtain better results.

This study analyzed documents related to CALL published and indexed in *Web of Science*, *Scopus, EBSCOhost* and *ScienceDirect* during a specific period. In order to understand the continuous trends and patterns in this discussed issue, it is also recommended that similar studies should be conducted with the journal base, and should be repeated at least every five years. What's more, future studies could focus on citation analysis and on different sub-domains of the CALL such as computer-mediated communication, e-portfolio in CALL, LMS in CALL, language learning and multimedia, distance language learning, and mobile learning usage in CALL, etc.

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Bilgisayar Destekli Dil Öğrenme Çalışmalarında Araştırma ve Yönelimler: Bir Meta-Analizi Çalışmasının Sonuçları

(Özet)

Problem Durumu: İçerik ve meta-analizi çalışmaları, psikoloji, cografya, fen eğitimi, sağlık bilimleri, öğretim teknolojiler ve bunlar gibi bir çok alanda yapılmaktadır. İçerik ve meta-analizi çalışmaları alanda belirli bir süre içerisinde meydana gelen araştırma ve yönelimleri belirleyebilmek için uygun araştırma yöntemleridir. Son yıllarda bilim ve teknolojide meydana gelen değişimlerle birlikte bilgisayar destekli dil öğrenme alanınında araştırma ve yönelimlerinin belirlenmesi zorunlu bir ihtiyaç olarak görülmektedir. Yapılan literatür çalışması sonucunda bugüne kadar bir içerik veya meta-analizi çalışmasının yapılmadığı görülmektedir. Bu çerçevede bilgisayar destekli dil öğrenmeyle ilgili bir meta-analizi çalımasının yapılması zorunlu olarak görülmektedir.

Araştırmanın Amacı: Bu çalışmanın amacı 1990–2008 yılları arasında bilgisayar destekli dil öğrenimi ile ilgili araştırma ve yönelimleri ortaya koymak olarak belirlenmiştir. Bu amaç doğrultusunda bilgisayar destekli dil öğrenme çalışmaları; döküman tipi, yayın dili, yayın yılı, yayınlandığı kaynak, yazarlar, sıklıkla kullanılan anahtar kelimeler, yıllara göre atıf durumu dağılımı ve en çok atıf yapılan eserler boyutları bakımından incelenmiştir.

Araştırmanın Yöntemi: Bu çalışma meta-analizi yöntemine göre yürütülmüştür. 1990-2008 yılları arasında *Web of Science*, *Scopus, EBSCOhost and ScienceDirect* veri tabanlarında indexlenen bilgisayar destekli dil öğrenme ile ilgili eserler "bilgisayar destekli dil öğrenme", bilgisayar destekli dil öğretimi", "teknoloji destekli dil öğrenme" vb. gibi anahtar kelimeler girerek taranmıştır. Yapılan tarama sonucunda toplam 1358 döküman elde edilmiştir. Bu kaynaklar; başlık, özet, anahtar kelimeler ve tam metinleri bakımından teker teker incelenmiştir. Yapılan incelemeler sonucunda bilgisayar destekli dil öğrenme ile ilgili 1309 döküman araştırmanın kapsamına seçilmiştir. Seçilen dökümanlar döküman tipi, yayın dili, yayın yılı, yayınlandığı kaynak, yazarları, sıklıkla kullanılan anahtar kelimeleri, yıllara göre atıf atıf alma durumu bakımından analiz edilmiştir. Bunun yanında en çok atıf yapılan 10 döküman; araştırma konusu, odak noktası ve araştırma deseni boyutları bakımından incelenmiştir. Araştırmada elde edilen verilerin analiz için betimsel istatistik kullanılmıştır.

Araştırmanın Bulguları: Araştırma sonunda, bilgisayar destekli dil öğrenme ile ilgili elde edilen bulgular şöyle olmuştur. Bilimsel makaleler (%76.24) en fazla yayınlanan döküman çeşidi olurken, dökümanların neredeyse tamamı (%99) İngilizce dilinde yayınlanmıştır. Elde edilen 1309 dökümanın %55.69'u *Computer Assisted Language Learning* dergisinde, %19.56'sı *Language Learning and Technology* dergisinde, %1.99'u *System* dergisinde ve %1.76'sıda *Computers & Education* dergisinde yayınlanmıştır. Bilgisayar destekli dil öğrenme ile ilgili dökümanlar yayın yılına göre incelendiği zaman, sürekli

olarak yıllara göre yayın sayısında bir artışın olduğu görülmektedir. 1990 yılında 26 olan döküman sayısı, 2005'de 118 olarak gerçekleşmiştir. Yayın yılına gore, 1997'den sonra döküman sayısında yüksek bir artış gerçekleşmiştir. Bilgisayar destekli dil öğrenme alanıyla ilgili yapılan çalışmaların büyük bir çoğunluğu iki veya daha çok yazarlıdır.

Yapılan incelemeler sonucunda bilgisayar destekli dil öğrenme çalışmalarında çoktan aza doğru en fazla kullanılan anahtar kelimeler; "konuşma becerileri", "öğrenme sistemleri", "bilgisayar destekli dil öğrenme", "websiteleri", "insan", "bilgisayar destekli öğretim", "doğal dil süreçleri sistemleri", "akıllı tutoring sistemleri", "insan bilgisayar etkileşimi", "bilgi analizi", "cinsiyet", "uzaktan eğitim", "bilgisayar destekli işbirlikli öğrenme", "veritabanı sistemleri", "dil öğretimi", "bilgisayar ortamlı iletişim", "etkileşimli öğrenme sistemleri", "bilgisayar yazılımları", "çoklu ortam sitemleri" ve "dil hatası analizi" dir. Bilgisayar destekli dil öğrenimi ile ilgili olarak 1990-2008 yılları arasında toplam 3536 atıf yapılmıştır. Yapılan atıfların yarıdan fazlası 2005 – 2008 yılları arasında olmuştur. 2007 yılı (n = 934) en fazla atıf yapılan yıl olmuştur. Yazarlar tarafından yapılan atıf sayısında 2000 yılından sonra gözle görülür bir artış gözlenmiştir.

Web of Science veri tabanında yapılan analizler sonucunda en fazla atıf alan 10 döküman belirlenmiştir. Bu dökümanlar araştırma konusu, odaklandığı alt konular, araştırma deseni ve aldığı atıf sayısı bakımından incelenmiştir. Elde edilen sonuçlara gore Beauvois'in (1992) "*Computer-assisted classroom discussion in the foreign-language classroom - conversation in slow motion*" isimli makalesi 26 atıf ile birinci olmuştur. En fazla atıf alan 10 makalede en çok ''*kültürlerarası öğrenme*" ile "*bilgisayar ortamlı iletişim*" konuları tartışılırken, araştırma deseni olarak çoktan aza doğru; betimsel, tartışma, ve deneysel araştırma yöntemleri kullanılmıştır.

Araştırmanın Sonuçları ve Öneriler: Bu çalışmada elde edilen bulgular çerçevesinde, bilgisayar destekli dil öğrenme ile ilgili dökümanların 1997 yılından sonra belirgin bir artış gösterdiği, 2005 yılında ise doruk noktasına ulaştığı görülmektedir. Bu sonuç, bilgisayar destekli dil öğrenme alanıyla ilgilenen akademisyen, eğitim yöneticileri, öğretmen ve öğrencilere yön verebilme bakımından oldukça önemlidir. Bu çalışma 1990- 2008 yılları arasında *Web of Science*, *Scopus, EBSCOhost and ScienceDirect* veri tabanlarında bulunan bilgisayar destekli dil öğrenme dökümanları ile sınırlı olurken, bu alanda yayın yapan dergi tabanlı benzer çalışmaların yapılması, alana farklı bir boyut katabilir. Yine, bilim ve teknolojideki gelişmeler dikkate alındığında, bu çalışmaya benzer çalışmaların her beş yılda bir tekrarlanmasında fayda vardır. Bunun yanında, bilgisayar destekli dil öğrenmenin alt boyutlarından olan; çoklu dil öğrenme ortamları, uzaktan tabanlı dil öğrenme, dil dersi yönetim sitemleri, mobil dil öğrenme vb. gibi konularda meta-analizi çalışmaları yapılmalıdır.

***Anahtar Sözcükler*:** Bilgisayar destekli dil öğrenme, meta-analizi, araştırma,yönelimler, index

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Benefit of Google Search Engine in Learning and Teaching Collocations

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Abstract

Background: Recently increasing attention has focused on collocation, theoretically presented as a central mechanism of language. Although semantically transparent, collocations are not freely available by means of synonyms, substitutability of which is subject to arbitrary, crosslinguistic influences. Advantage of frequency for retrieval is counterbalanced with their tentative nature challenging the L1-L2 connection in the mental lexicon. Access to English corpora can provide conditions to study them effectively. Search engines discover patterns in their authentic contexts. L2 students/users should use this know-how.

Purpose of Study: This article aimed to provide evidence that it is possible to help the learner through Google search engine to access, select, and/or produce the correct collocation out of a number of potential collocational candidates.

Sources of Evidence: Google search engine was used as a source of evidence. It makes it possible to have adequate corpora to have an idea about the tendency of collocations. If the phrase is put in quotation marks, Google can make a match for the exact string of characters typed. If dictionary lookups of a translation equivalent of a word in an L1 collocation indicate more than one English word, Google helps to choose the correct synonym in search trials of these synonymous candidates.

Main Argument: Collocational candidates (for instance, "much smoking" and "heavy smoking") were typed in quotation marks to have exact matches. The search showed the number for occurrences. In case the search included extensions (much smoking extended with "how" in "how much smoking") of the collocational candidates, the variables which constitute the extensions were searched in the same manner. The number for each extension was subtracted from the number for the target collocation. The results indicate that the higher number of search results can be macro indicators of collocations. Search was elaborated with analyses of the contexts excluding the kind of websites with structural mistakes/errors.

Conclusions: Google may be used as a practical and free-of-charge tool for the English L2 learner/user to make informed guesses about the tendency

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in discourse to have an idea about collocational candidates and choose the right one(s). It will facilitate the productive attempts of an L2 learner or a translator who has difficulty due to crosslinguistic differences, and even a nonnative teacher in assessing students' exam papers. Results may give ideas to companies to develop free products based on their search engines. Future research should cover collocations of other languages.
Keywords: CALL, Learning and Teaching English Collocations, Search Engines, Google, Turkish

There has been an increasing awareness of collocations over the past few decades on the part of (foreign) language teachers and dictionary makers who take into account complex nature of lexical knowledge (van der Meer, 2001). Carter (1998) classifies this knowledge into syntactic, semantic, stylistic, and collocational dimensions. Guo and Zhang (2007) emphasize the scarcity of the sources supplying a description of collocations in a professional, systematic, and dynamic manner. Carter's definition suits the aim and scope of this article: patterns of cooccurence, which can be lexical in that certain lexical items will cooccur in a given linguistic environment and grammatical resulting primarily from syntactic relationships involved.

It is widely acknowledged that collocations should play an important part in language teaching since their acquisition results in natural language with fluency and native-like selection (Nesselhauf, 2003, p. 223). They constitute seventy percent of the English language (Lewis, 2000). Grammatically acceptable they may be, speech lacking them sounds odd. The most challenging characteristic is the arbitrariness in the ways words collocate. Mere availability of synonyms falls short of producing or processing natural language without familiarity with collocational restrictions operating across the entire phrase. Nesselhauf (2003, p. 225) emphasizes that arbitrary restriction on substitutability (reach a decision/conclusion/compromise but not reach aim) is the most widely defining criterion for collocations.

The arbitrariness in the ways words collocate is more challenging interlingually, which Siepmann (2005) states makes collocations key sources of difficulty for L2 learners. Nesselhauf (2003, p. 223) argues that L1 as a crosslinguistic factor has been underestimated. This problem is more acute with languages belonging to different language families.

Special attention should be paid to collocations with L1-L2 non-congruence (Nesselhauf, 2003). In order to notice these crosslinguistic differences, L2 learners should pursue their studies in input-rich conditions. His/her study materials should be based on the English language corpora. These compilations of natural language are available to anyone with Internet connection. When in doubt, the non-native learner or user of English can search, access, and analyze the contexts in collections of authentic language texts. There are softwares specifically designed to meet this end. Either installed on a computer or accessed through a website, concordancers can be used to explore how words combine with each other in authentic contexts and reach the most frequent, up-to-date and correct collocations. However, these are not

suitable for low level students as can be inferred from the majority of authentic texts (Peachey, 2005). Besides, as in Guo and Zhang's (2007) criticism, the other reasons discouraging their use are high prices and complexities in the use of technological products. Therefore, they do not engage the learner's interest.

Results of teaching collocations have not been very satisfactory and have suffered considerable neglect (Nesselhauf, 2003). Part of the reason lies in the fact that technology has not been applied to education. Computer technology has not been used to the extent it should (Isman, Yaratan & Caner, 2002), which reflects on the particular of CALL and collocations, an area which Nesselhauf and Tschichold (2002) consider as largely neglected in CALL. It is curious that we cannot benefit from the large English corpora. Fletcher (2005) argues that around two-thirds of the content indexed in early 2005 is English-language documents according to the data from the large search engines (Google, Yahoo, MSN, and Teoma).

Practical solutions should be found for teaching/learning collocations considering the facilitating factor of technological advancements. One such practical solution may come along with search engines as the free means to reach those collocations. With the largest corpus in the world, Google search engine (Guo & Zhang, 2007) can be used to enhance language learning. It has the means to provide information about the tendencies in collocational use. With too many collocational candidates to choose from, the L2 learner can search its large database typing in those candidates in double quotation marks to find the words as written.

Review of Literature

According to Lewis (2000), L2 students should be focused on collocations, which he considers useful to get through intermediate to further levels. McCarthy and O'Dell (2005) argue strongly that special efforts be made to learn them to produce natural English with style and richness of variety. Martynska (2004) argues that the acquisition of collocations is crucial in second language acquisition (SLA).

Nesselhauf (2003) states that despite the common acknowledgement that collocations are both indispensable and problematic for language learners and therefore should play an important part in second language teaching, especially at an advanced level, L2 learners difficulties have not been investigated as detailed as it should have so far. There are several reasons to teach collocations. It might be suggested that there is no natural spoken or written speech which is collocation free in the broadest understanding of the term (Heikkila, 2005). One of the scholars who emphasize collocation instruction is Lewis (2000) who affirms that the percentage of collocations in English is at least seventy percent, an acquisition of which would help students make progress through the intermediate to the advanced level. Nattinger and DeCarrico (1992: cited in Carter, 1998) argue in favor of their potential usefulness in regards to the effective management of academic spoken and written discourse. Nesselhauf (2004) suggests that pragmatic chunks should be available to the learners to decrease the deviance in producing collocations.

Challenges: arbitrariness and L1 interference. One of the reasons for this deviance is a certain extent of arbitrariness in terms of restrictions operating in the choice of

collocators. As to what synonyms may substitute for one of the components, selection of potential candidates results in only a subset (van der Meer, 2001). Negligent of collocational restrictions, foreign language learners often assume that synonyms would substitute for each other due to their semantic appropriacy. According to Siepmann (2005), "Collocation remains an arbitrary phenomenon based on language games."

In terms of collocational usage in the target language, a conflicting area is L1 interference, or language transfer. The number of collocational mismatches is quite high. Due to this big amount and a certain degree of arbitrariness of their lexical composition, rote-learning may be seen as the only way to commit them to memory, but this does not appeal to many students. Therefore, they produce deviant collocations and overuse (or underuse) specific types of collocations, L1-L2 congruence playing a factor. Granger's study (1998: cited in Lesniewska, 2006) reveals predominance of L1-L2 congruence in advanced learners' use of collocations. Nesselhauf (2003) has studied German students of English L2 who produced errors related to non-congruence despite the factor of the same language family. L1 turns out to have a degree of influence that goes far beyond what earlier (small-scale) studies have predicted, which has implications for teaching.

The studies with little evidence of crosslinguistic transfer are very rare to find, but this still implies their command is not impossible and suggests that it can be enhanced by teaching. Lesnievska (2006) compared both English and Polish university students testing adjective intensifiers. It was more difficult for the non-native than native speakers to recall appropriate collocations; nevertheless, they ended up using fewer restricted collocations and in general managed to avoid errors more than expected. This finding contrasts with conclusions of many other studies (e.g. Howard, 1996; Kllkvist, 1998: cited in Lesnievska, 2006, p. 75) which emphasize the problematic nature of collocations in the acquisition of English as a Foreign Language (EFL). Lesniewska (2006, pp. 75-76) attributes this to overgeneralizations of the terms "advanced students" and "collocational errors." The treatment group had a high command of English comparable to the control group studying at UK universities. Besides, lack of the students' errors partly sourced from avoiding even collocations with L1-L2 congruence due to their awareness of false friends.

Martin (1984: cited in Carter, 1998) states clearly that collocational dissonance is a main type of dissonance between a lexical item and its appropriate use along with stylistic, syntactic, and semantic dissonance. Her research led her to conclude that advanced students often set up false-equivalence assuming that synonyms may substitute for one another in collocations. According to Carter (1998, pp. 73-74), learners frequently mismatch collocations due to an inadequately frequent encounter with word combinations to demarcate the range of use. Particular difficulties are to do with semantic opacity (e.g. heavy drinker) or discourse restrictions (e.g. light pastry). For instance, amicable divorce is an acceptable collocation, but "friendly divorce" is not, although "friendly" is synonymous with "amicable" as fat paycheck is not the same thing as obese paycheck. Looking up the L1 language equivalent of an L2 word, it is possible to find an entry with more than one equivalent, especially

so when this is a word of a language with one of the largest vocabulary, English. If L1 (in our study, Turkish, a member of Ural-Altaic language family) and L2 (English) belong to different language families, the disadvantage of a much less L1-L2 congruence is more challenging.

Nation (2006) argues that both list learning and contextual learning should be involved in a balanced way. Forming a target list and the means to access contexts including the target collocations may be a part of this approach. The input frequency is enhanced and the collocations are not isolated from their contexts as well.

Fluency: result of processing wholes rather than parts. Collocation is important for L2 learners to appreciate and produce speeches which are not only accurate and stylistically appropriate but also fluent (Heikkila, 2005). Fluency stems from the holistic nature of multiword combinations, as reported by Wray (2002: cited in Bauwens & Eyckmans, 2006). This way of learning suits the L2 learners' inclinations as well since both native and non-native speakers tend to "store and retrieve whole chunks rather than create them from scratch." (Martynska, 2004, p. 10). Cognitive resources required are fewer than creative generation via lexical and syntactic construction (Pawley & Syder 1983; Schmitt 2004: cited in Bauwens & Eyckmans, 2006). Learning a whole set of words decreases burdens on memory, which single item learning may bring about (Nattinger & DeCarrico, 1992: cited in Carter, 1998). Recycling lexical phrases reduces processing effort (Carter, 1998, p. 226). Demands on storage space are compromised with speed and ease in production (Nation, 2001). Lewis (2000) argues that most collocations are in the middle of this continuum and medium strong collocations should be targeted since they constitute the largest part of the lexis required for a good command. However, as Lesniewska (2006) states, the strength of the activation of links gets weaker in the middle of the free-fixed continuum and the often idiosyncratic restrictions are especially liable to crosslinguistic inflences.

Materials to learn/teach collocations and the need for alternatives. Having input-rich conditions facilitates language learning; and, diversity of these conditions can stimulate and engage learner attention. Having access to good materials is important since even a native speaker's intuition often fails to accurately reflect actual language in use. Collocation dictionaries and concordancers may serve teaching/learning collocations to some extent, and these are provided on the internet as well. For many, the ubiquity of computers and easy access to the Internet makes it easier to make the most of this facility. Internet sources have a good potential for education. According to Siepmann (2005), the Internet sources constitute most of the sources in the compilation of the examples in the three unabridged bilingual thesauri (intended mainly for non-native speakers of English, French, and German). Nation (2006) encourages computer-assisted vocabulary learning citing the possibilities which have been and will be brought along through their use. Nation mentions the results of computer-based analyses (e.g. frequency-based word lists, Nation, 2006, the academic word list, Coxhead, 2000, procedures for determining technical vocabulary, Chujo & Utiyama, 2006; Chung & Nation, 2004 : cited in Nation, 2006). He also suggests what sophisticated computer technology can do to analyze learners'

writings, programs designed for the deliberate learning of vocabulary, text-linked aids to learn more efficiently, or word processing tools for feedback on learners' work.

According to Harwood (2002), learners can have access to real and living English with corpus-based ELT materials. As part of the authentic English, collocations can be systematically recycled. The findings of the applied linguistics research suggest its benefits as well. However, with its conservatism well documented, the English language teaching (ELT) industry is not very efficient in keeping up with these findings and many course books fail to recycle lexis. It is not as efficient in keeping up with the applied linguistics research. If teachers are obliged by their institutions to follow their course books slavishly, the chances of recycling are even less, let alone making it in refreshing and engaging ways. Teachers' time restraints and excessive workload makes it difficult for them to prepare their own materials. Furthermore, teachers are not able to consult corpora as much as they should due to very high access fees, which reflect publishers' commercial interests.

On the other hand, it is possible to make materials out of the English corpora on the Internet, which can be recycled in refreshing and engaging ways to provide repeated exposure of real English in various and novel contexts. The learner needs to feel involved in the development of their own materials. Teachers can guide students to be creative and resourceful in preparing the online contents (which facilitate updating) which they can use in the pace they want to learn what they need the most and the earliest.

The question of the availability of these advantages to most teachers and learners implies the need for more commonly available computer-related resources. According to Guo and Zhang (2007), the disadvantages are their prohibitive prices, unreliability, and difficulty and complexity of connection as well as retrieval and analysis of data from remote servers, which makes them inaccessible to most of the ordinary language learners and teachers, which may be reckoned as an outstanding number of people.

The possible benefit of Google. Alternative sources of exposure to authentic texts should be sought. These may be free or much less expensive to students. The Internet is one of those sources. Access to the Internet is free in many university campuses around the world. The number of people who enjoy wireless broadband Internet coverage is increasing as well. Kampschror (2006) announces in the newspaper, *USA Today*, that Macedonia is possibly the world's first all-wireless Internet country, where Internet access is available to virtually anyone. Given these motivating conditions, it is easier to agree with Guo and Zhang (2007) that the Internet is a convenient platform to investigate and verify frequency, context, and source of a combination.

Fletcher (2005) argues that the Web can be consulted directly as a corpus due to the inexhaustible reservoir of machine readable texts in most written languages it contains. It is suggested as one of the appropriate means for language-related studies since the constant change and growth in the Web suit well with the evolving nature of the language. Fletcher (2005, p. 4) presents the reasons for using the Web as corpus. These are freshness and spontaneity; completeness and scope; linguistic diversity; cost and convenience; and representativeness.

The question is which search engine is better to benefit from these advantages as much as possible and channel these into finding out the proper forms of collocations through search engines. Based on the most reliable estimates, Fletcher (2005) emphasizes the number of publicly-indexible webpages in mid-2005 as falling in the 10-20 billion. The rapid, radical change of the web is emphasized comparing this number with the number of Web pages indexed in 2006 by Google which has surpassed 25 billion in addition to more than one billion Usenet messages. It also caches much of the content indexed (Wikipedia, 2008). According to Guo and Zhang (2007), it is possible to build a customized Google-based collocation collector and enhance language learning. We can benefit from Google in collecting and indexing requested collocations, the largest corpus in the world is available from Google, though only indexing the first 100 Kb of any page.

Google is reported in the tutorial of Teaching Library Internet Workshops of UC Berkeley (n.d.) to have the largest database of Web pages providing almost half of the searchable Web. Its popularity ranking feature makes it possible to get useful/informative/entertaining sites rise near the top search results. It is possible to see blogs but the advertisements are very rare. One other feature which makes it competitive is the feature of "reject a term or phrase." In order to exclude documents containing a term or phrase, a minus (-) sign is inserted immediately before a term (no space). It can also be used in the same manner before the " ", delimiting a phrase, which would be used here if it could function as shown in this article.

Search engine databases are selected and built by computer robot programs "spiders," which pass the pages they find on to another computer program for "indexing." Google has this system. Mardis (2001) states that Yahoo is human-mediated, therefore such a directory's staff can only review and classify a finite number of sites. Search engines have the means available for users beyond the classification of directory editors to gain term level control over search results. There is not one best search engine, but preferring Google is justifiable with its broad, deep indexed content, ease of use, speed of searching, and result relevancy.

Purpose of the Study

The technological features of Google search engine suggest that it can help choose the correct collocation out of the possible collocational candidates. The purpose of this study is to find out whether Google search may result in a higher number of search results. If so, the learner may combine this quantitative macro indicator with a qualitative analysis of the contexts to end up with the proper collocation.

Google as a Source of Corpus and Evidence

Lists of erroneous collocational usages with L1 interference were produced by the author reflecting on his professional teaching life, specifically the recurrent errors of his students, and his experiences of L2 learning, using and translating. He also

Table 1

A Sample of Search Results

spend/spends/spent money	to for on	2/0/0 46700/3/3640 57500/1270/583	something
remedy	to for	6/29/135 9940/6650/6880000	diseases/a disease /the disease
discuss/discussed/discussing	about ---	216/7/3 983000/27300/21400	the policy
statistically	important significant	18800 9650000	increase
tight heavy	6910 3180000		traffic
make/makes/made/making do/does/did perform/performs/performed	522000/119000/25300/85400 134000/43400/43100/43200 302000/28600/316000/33900		an analysis
big considerable	473000/98400 4470000/536000		amount/amounts
do/does/did/doing deliver/delivers/delivered/ delivering make/makes/made/making	284000/152000/38400/268000 286000/141000/427000/179000 1240000/154000/1050000/632000		a speech
marry/marrying with to	2750000/369000 11000/255 4600/49		her
there is my/there are my I have my	740/33 46500/18800		problem/problems
rotten corrupted	4890 8240		politics
operate/operates/operated/ operating run/runs/ran/running	692000/19100/1330000/1070000 4020000/21700/97800/2530000		business
make/makes/made/making hold/holds/held/holding	1260000/113000/17600/396000 907000/161000/456000/168000		a conference
financial fiscal	6100000 30300000		year
luxurious luxury	14300 68500		accommodation
expansive widespread	1440 72700		access
lively vivid	44600 556000		imagination
escape/escapes/escaped/escaping from skip/skips/skipped/skipping	201/3/7/8 56400/3420/28300/72300		classes
last/lasts/lasting lead/leads/leading	1/0/1 89400/3870/18400		a happy life
chickens lay eggs chickens do eggs	14100 3		

benefited from the feedback of his colleagues whose students' feedbacks revealed recurrent collocational errors in their writing-exam papers. The author as a non-native L2 user made such errors himself while translating from L1 Turkish to L2 English.

The lists were searched as enclosed in quotation marks and the numbers of search results were compared. The numbers of occurrences were evaluated with their

contexts. The results were discussed as regards to how the Google search results can be used considering possible limitations.

The searches were tried for verbs in different tenses and plural or singular nouns. The numbers below (as all Google search results in this article) were those updated on June 26, 2008. Despite differences, numerical levels were parallel to each other and indicate consistency.

In general, above examples indicated higher numbers for stronger tendencies to collocate. However, collocations with "hold" got lower numbers compared to those with "make," analyzing contexts showed the reason. Some of the examples included causatives with "make," which made it indexed frequently due to its grammar function. Students may not be equipped in terms of grammar knowledge and fail to make right judgments and need a teacher as a facilitator.

Table 2

Change in Numbers after Extractions

keep attendance take attendance	17600 -27 97300 -10500	-records	17573 86800
much smoking heavy smoking	51100 -21400/-9180/-9080 126000 -467/-1/-1	-too/-how/-so	1920 31100

Contexts helped fine tune the search. Higher numbers in themselves may be inadequate to validate phrases and may lead to oversimplistic interpretations. Searching the first two phrases brought contexts with "records." Despite a subsequent elimination resulting in -10500, the number was still higher in favor of "take attendance." The contexts for "much smoking" included "how much, so much or too much" before "smoking." Eliminating favored the latter more.

Punctuation marks (full stop, apostrophe, parentheses, ellipsis, etc.) should have been taken into account when evaluating the validity of the comparisons. For kid delinquency/lad delinquency/child delinquency, the numbers were 6/2/9450 respectively. The first included "kid's delinquency." Likewise, 60600/25800 results were had for "said a lie/said lies" in comparison to 332000/132000 for "told a lie/told lies" (Mao said 'a lie told a hundred times becomes ....' or 'What Jesus actually said lies hidden in the gospels.').

It was better to avoid word-for-word translations. "See/sees/saw a dream," which got 1630000/106000/625000, was such a translation from Turkish. Search suggested a tendency toward "have /has/had a dream" with 6200000/5620000/10100000. Trying with the plural gave a similar result: "See/sees/saw dreams" got 81100/3720/4710" whereas "have/has/had dreams" with "1520000/221000/694000. "Gave a harm to" (exactly as it was written) got zero (which may help the learner to avoid a possible word-for-word translation) while "harmed the" got 366000 results. The preposition "to" and the definite article "the" were used as a measure to exclude adjectives." Without "to," the private name "Harm" was seen in

contexts. Trying "give a harm to" got 6 results though with this context: "… give a harm-to-non-parties instruction.…"

Conclusion

The searches with higher numbers tended to suggest those collocations with greater tendency to collocate. However, results suggest tendencies rather than absolute restrictions. Use of search engines may provide L2 students with more information about which collocational candidate to choose from. The learner can guess what those collocational candidates might be beforehand if he or she already knows the synonymous L2 alternatives to replace the L1 word in the L1 collocation, or dictionary lookups may give these alternatives. Put in quotation marks, they can be tried in Google search which gives idea with the number of occurrences in corpora as to the possible tendency. It may help them to make the most of these tendencies with repeated exposure and diverse contexts in refreshing and invigorating ways. Foreign language learners can test alternatives against search results making informed comparisons. Subtle differences may be detected. However, it is important to note that the more the student's prior command of English the more the benefit would be realized, especially more so with a teacher who can guide him or her. It is easy to teach students how to use Google with its pros and cons. The student is more active in his own learning, taking decisions with initiative, which suggests more independence. This practice would also be good while doing translating work, especially when printed collocational materials are unavailable or inaccessible.

Even though there are collocational dictionaries in the market, they are few in number compared to other lexicographic resources. Nevertheless, students can turn common technological resources into dictionary-like materials. After all, dictionary entries and their definitions are selected out of actual speech records (Hayakawa & Hayakawa, 1990). This way, they can be aware of more various contexts surrounding the target collocations.

This study did not cover the differences between Turkish and English in terms of the agglutinative morphology of Turkish language. However, this limitation should not be overestimated since the Turkish students overcome this kind of crosslinguistic difference by the time most of the collocational teaching starts. In general, teaching collocation is a subject matter of intermediate and the subsequent levels.

Our study showed that Google use does not merely have to do with just numbers. The contexts should be analyzed. There are some implications in Siepmann's (2005) study for the study of collocations. The L2 teacher should guide the students to distinguish semantically autonomous words. For instance, "empty" and "free" can both be used before "parking lot" only to result in different meanings. Googling both as keyed gave 149000 results for the former and 6442000 for the latter. Unaware of this meaning difference, the L2 learners may attribute the higher number to a stronger tendency. On the other hand, there are synonymic collocations as in crack/make a joke "where the verb would be regarded as semantically contingent on the noun." The learners should also be made aware of the semantic features of a word, for instance an adjective, which are incompatible with a noun. For instance,

"quiet drink." However, its use is justifiable if "quiet" is used to describe the situational context in which the drink is taken into account. Trying it in Google as keyed has given 169000 results, which would be used as a cue for its frequency.

Google search results should be interpreted by someone whose collocational knowledge is adequate to guide himself or herself or his or her students. It is not merely a matter of quantity which determines collocational candidates. Equipped with collocational knowledge, L2 learners can make educated guesses as regards to the search results.

Although simple to operate for low level students as well, teachers should be cautiously optimistic as to their evaluations of the search results. Even with intermediate and advanced levels, its success depends on the learner's ability and collocational knowledge to analyze the results and elect the wrong candidates. Not all search engine results should be taken into consideration as well. The high marks which a search result gets should not be overestimated, either. For instance, forums (excluding, for instance, grammar forums or like) or personal profiles, which are not checked for their linguistic accuracy, may contain linguistic errors or mistakes; however, some forums may provide proper explanations by a teacher or ELT materials writer writing on the target language as well. With an exception to websites of educational or professional institutions, newspapers or encyclopedias, some sites written by non-native speakers of English may also contain too many errors. Therefore, it is always good not to overgeneralize high number of search results and to give benefit of doubt that search engines might include inappropriate and/or mal-used forms of words and allocations. Google's popularity ranking feature might help, however this feature is not a guarantee. A teacher can help, but he or she can not be beside the teacher every time they need help.

It is also possible that, avoiding the idealized Anglocentric use of English, some sites may express a separate cultural identity of users of a non-native variety of English. Sometimes, the difference in word combinations can be productions of creativity or exaggerations. This should not invalidate such a combination. For instance, 7380000 search results for "heavy rain" does not overshadow the creativity effect which is possible to see in some of the 27400 sites for "slow rain." These and other contextual factors (mentioned above) suggest that the more equipped the learner is the higher the search results can be evaluated. Besides the quality of the candidates, the number of the candidates searched should be higher.

Search engines have a disadvantage, too. There are many teachers in the world that do not have access to the Internet, although this study saw the full part of the glass. With this assumption, students, translators, or teachers may benefit from the search engines to see the tendency in discourse as to how collocations tend to be used. At least, they can be supplementary means which may give some ideas on updated information in case the traditional structure of ELT market falls, in terms of its commercial products, behind the evolving nature of language however slow this process may be.

Suggestions for further research. Long term studies are required to verify stronger arguments on behalf of search engines. Longitudinal studies of application of Google in classroom situations may help us to track learners' learning processes. It may also be suggested that future research can be conducted to monitor students' queries, which may suggest some ideas about the mental processes they were involved in. This in turn can also be used to update ELT materials designers or collocational dictionaries. This study may be adapted to other studies with other L1s and L2s as, according to Fletcher (2005), the Web seems to have more coverage now than the past for languages other than English. Besides, hopefully, search engines further develop their products so that they can provide better means to make subtle judgments on deciding about the tendency of words to combine.

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İngilizce Eşdizimlerini Öğrenme ve Öğretmede Google Araştırma Motorunun Kullanımı (Özet)

Çalışmanın Temeli: En popüler uluslararası dillerden biri olan İngilizcede kelime sayısı son derece yüksektir. Bu nicel zorluğun yanında kelime bilgisinin karmaşık ve farklı nitel boyutlarında da yeterlik gösterilmesi gerekmektedir. Birden çok kelimenin belli bir sırayla kombinasyonlar oluşturması söz konusu nicel ve nitel yükü artırmaktadır. Kelime dizilerini, bir ucunda sırası pek değişmeyen deyimlerin diğer ucunda da açık uçlu,

değişken birleşimlerin yer aldığı bir düzlemde düşündüğümüzde öğrenilmesi daha zor olan kısmın orta kısımda yer alan eşdizimlerdir. Deyimlerdeki gibi değişmez ve net bir hedef oluşturmazlar, bunun yerine hangi kelimeyi hangisinin izleyeceği çok net olmayan eğilimsel bir doğadan bahsetmek mümkündür. Bu eğilimsellikte önceden tahmin etmesi çok zor bir keyfilik vardır. Eş anlam bilgisi yeterli değildir, hangi eş anlamlı kelime adayının eşdizimi oluşturacağını bilmek gerekir. Diller arasındaki farklılıklar – özellikle farklı dil ailelerinden olanlar – düşünüldüğünde bu seçim daha da zorlaşır. Ancak, hedef, ana dili konuşucusu düzeyine yakın, doğal ve yaşayan İngilizceyi öğrenmekse – ki pek çok öğretim bağlamında nihai hedef budur – eşdizimlerin öğrenilmesi için çözümler bulma gereği vardır. Ancak mevcut materyallere ve imkânlara ulaşmada bir takım sorunlar yaşanmaktadır. Yayın endüstrisinin muhafazakâr yapısı materyallerin derlemlere dayalı olmasını sağlayacak gerekli değişimleri gerçekleştirmede ağır kalmaktadır. İngilizce kitapların içeriklerinde yaşayan ve doğal İngilizce yeterince yer almaz. Ticari nedenlerle, yayın şirketleri öğretmenlerin derlemlerle ilgili kaynaklara ulaşmasını kolaylaştırmamaktadır. Eşdizimlerin de içeriği olduğu kaynaklara ulaşmanın maliyeti yüksektir. Zaman bulamadığından ve azami ders yükünden dolayı kendi materyallerini hazırlama imkânlarını azaltmaktadır. İnternete ulaşılabileceği kabul edildiğinde artık internetin olduğu ve materyal fazlalığının olduğu savunabilir. Ancak bu kaynakları gelişigüzel bir şekilde basarak öğrenciye sunmak öğrencinin yükünü fazlalaştırır ve ilgisini azaltır. Gereksiz olarak algıladığı bilgileri ezberlemek bazen kısa vadede bile etkisiz kalabilir. Mevcut araçların, öğrencilerin istek, ilgi ve önceliklerine göre ilgi çekici tekrarlar yapmayı kolaylaştırması gerekir. Yaygın, ulaşması ve kullanması kolay araştırma motorları İngilizce derlemlere ulaşmada uygulama kolaylığı katabilecek araçlar olabilir.

Çalışmanın Amacı: Bu makalenin amacı Google araştırma motorundan yardım alarak eşdizim adayları arasından doğru eşdizimlere ulaşılabileceğinin kanıtlarını sunmaktır.

Kanıt Kaynakları: İngilizce derlemlere ulaşmadaki teknolojik üstünlüğü kabul edilen Google ile eşdizimler tırnak içinde aranmıştır. Karşılaştırmalarda kullanmak için çıkan sonuçların sayısı kullanılmıştır. Arama sonuçlarında hedef eşdizim yerine eşdizimi de içeren uzantıların bir değişken olarak sonuçları analizine zarar verebileceği düşünüldüğünde, bu değişkenleri ayrıca taramak ve iki aramada ulaşılan sitelerin sayılarını birbirinden çıkarmak mümkündür. Ayrıca, arama sonunda çıkan içeriklerin bağlamını incelemek daha doğru karşılaştırma yapma imkanı verir.

Ana Tartışma: Güçlü, ücretsiz ve kolayca ulaşılabilecek bir araştırma motoru olan Google İngilizce eşdizimleri öğrenmeyi kolaylaştırdı. Derslerinde sıklıkla eşdizim yanlışları gözlemleyen öğretmenlerden ve dil öğrenme/öğretme/kullanımı ve çeviri sürecinde yazarın kaydettiği

eşdizim hatalarından yararlanarak oluşturulan listedeki eş dizim adayları, Google araştırma motoruyla internette arandı. Bu aramaların eşdizimlerdeki kelime sırasına uyması için anahtar ifade tırnak içine alınarak arandı. Google bütün sonuçları kısmi içeriği ve bağlamıyla belli sıra içinde sundu. Bulunmuş içeriklerin sayısı ekranda yer aldı. Doğru eşdizim kullanımlarının daha yüksek sayıda araştırma sonucu çıkardığı ortaya çıktı. Bu sayının hangi eşdizimin seçilmesine dair makro bir gösterge olarak kullanılabildiği görüldü. Buna göre İngilizce derlemlere ulaşmada belli bir üstünlük sağlayan (ulaşılan İngilizce site sayısı oldukça yüksektir) Google araması, arama sonucu daha çok sayıda metinde olduğu görülen eşdizim adayı daha güvenilir bir seçenek olarak öne çıktı. Ancak ulaşılan metinlerin bağlamlarının da incelenmesini gerektiren durumlar ortaya çıkabildi. Yanlış eşdizim kullanımlarının doğrularına kıyasla daha düşük olsa da beklenenden fazla sayılarda çıktığı durumlarda bağlamlar incelendi. Bazı aramalarda, aranan eşdizimi bünyesinde barındıran başka ifadeler ya da başka eşdizimler görüldü. İki kelime dizisi de taranarak bu dizilerin yer aldığı web sitelerinin sayıları birinden çıkarıldı. Örneğin "heavy smoking" ve "much smoking" eşdizimleri karşılaştırıldığında, birinci ifade sayısal açıdan bir üstünlük sergiledi. Ancak ikinci ifadenin bulunduğu sitelerin sayıları da belli bir eşiğin altında diye algılanamayabilecek bir sayıdaydı. Bağlamlar incelendiğinde bulunan bazı ifadelerin araştırmaya konu olan eşdizim adayını bünyesinde bulundurduğu görüldü. Bu aramaya "....too much smoking....", "....how much smoking...." ifadelerinin de dahil olduğu ve "much smoking" teriminin aldığı sayıyı artırdığı ortaya çıktı. Bu gibi değişkenleri "how", "too", "so" gibi terimlerin bulunduğu uzantıları ortadan kaldırmak için bu kelime dizilerinin de Googleda aranıp elde edilen sayının hedef eşdizimi içeren web sitelerin sayısından çıkartılması gerekti. Böylece değişkenler azaltılmış oldu. Yararlı, bilgilendirici ve eğlendirici siteleri taramada öncelik kazandıran popülarite özellikleri ve nadir reklam içeriğiyle Google dilin doğal ve doğru kullanımlarının olduğu pek çok siteye ulaşmamızı sağladı. Ancak yine de içeriğinde dil bilgisi hatalarının olduğu siteler de aramaya dâhil edildiği gözlemlendi. Sonuçta aramayı yapan bunları ayırt edecek bir insan olmadığı ve sadece bir makine olduğu göze alındığında bu normaldi. Aramalarda site türlerinin ne olduğu görüldüğünden forumlar, ortak mesajlaşma ortamları, bloglar ve kişisel web sayfaları gibi sitelerin içeriklerine daha çok ihtiyatla yaklaşıldı. Bariz yapısal hatalar olan siteler, sitedeki dil kullanımının nitelikleriyle ilgili ipuçlarını barındırabildi. Dikkat edilmesi gereken bir siteyi ana dili konuşucusunun yazıp yazmadığıydı. Gerçi ana dili konuşucuları da sezgisel anlamda yetersiz kalıp yanlış eşdizimleri tercih edebildiklerinden böyle bir yöntem de eşdizimlerle ilgili karar vermede garanti bir yöntem olarak düşünülmedi. Bütün bu incelikler bağlamdaki ipuçlarının başlangıçtaki sayısal nitelikli makro göstergeyi desteklemek üzere kullanılmasını gerekli kıldı. Çok sofistike olmasa ve geliştirilmesi gerekse de bu teknolojik imkan,

aramaların daha rafine olmasını sağlayabildi. Araştırmanın uygulanması öğretmenler için bilgilendirici bir süreç oldu.

Sonuçlar: Google, pratik bir şekilde ve ücretsiz olarak, ikinci dil (İngilizce) öğrencisi/kullanıcısının (örneğin çevirmen) söylemde eşdizimsel eğilimleri konusunda daha nitelikli kestirimlerde bulunması için yardım alabileceği bir araç olabilir. Özellikle birinci ve ikinci dilin farklı dil ailelerinden olmasından kaynaklanan sorunlar azalabilir. Google, İngilizceyi ana dili olarak konuşmayan öğretmenlere de öğrencilerin yazılı kâğıtlarını değerlendirmede yardımcı olabilir. Sonuçlar ilgili şirketlerin arama motorlarını eşdizimlerin öğrenilmesi için geliştirmesi konusunda da fikir verebilir. Diğer diller üzerinde de araştırma motorlarının eşdizimler için yararı bağlamında çalışılması gerekir.

Anahtar Sözcükler: BDDÖ, İngilizce Eşdizimleri Öğrenme ve Öğretme, Araştırma Motorları, Google, Türkçe

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16	☐	Following the Turkish structured abstract, four to six keywords are included. Uzun Türkçe özetten sonra 4-6 anahtar sözcüğe yer verilmelidir.
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Düzeltme Notu / Correction Note

EJER'in 21. sayısında yayımlanan "Bilgi ve İletişim Teknolojileri ile Bütünleştirilmiş Fen Bilgisi Öğrenme Ortamı Üzerine Bir Araştırma" başlıklı çalışma Teoman Kesercioglu ve Bülent Cavaş tarafından yürütülmüş ve Dokuz Eylül Üniversitesi Bilimsel Araştırma Projeleri Şubesi tarafından desteklenmiştir.

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