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Message from the Editor-in-Chief

TOJET welcomes you. TOJET looks for academic articles on the issues of educational technology and may address assessment, attitudes, beliefs, curriculum, equity, research, translating research into practice, learning theory, alternative conceptions, socio-cultural issues, special populations, and integration of subjects. The articles should discuss the perspectives of students, teachers, school administrators and communities. TOJET contributes to the development of both theory and practice in the field of educational technology. TOJET accepts academically robust papers, topical articles and case studies that contribute to the area of research in educational technology.

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 The submitted articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJET.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

This journal was initiated in October 2002 to share knowledge with researchers, innovators, practitioners and administrators of education. We are delighted that more than 20000 researchers, practitioners, administrators, educators, teachers, parents, and students from around the world had visited the twenty second issue between January 01 and March 31 2008. It means that TOJET has diffused successfully new developments on educational technology around the world. We hope that this volume seven issue one will also successfully accomplish our global educational goal.

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

TOJET, Anadolu University, Near East University, Eastern Mediterranean University, Sakarya University, Governor State University, Ohio University, and Louisiana State University will organize the Eight International Educational Technology Conference (IETC 2008) in May 2008 in Eskişehir - Turkey.

The guest Editor of this issue is Prof. Dr. Halil İbrahim Yalın and the Editorial Board of this issue are Prof. Dr. Hafize Keser, Assoc. Prof. Dr. Ahmet Mahiroğlu, Assist. Prof. Dr. Halil İbrahim Bülbül, Assist. Prof. Dr. Ebru Kılıç, Assist. Prof. Dr. Şirin Karadeniz. TOJET thanks the guest Editor and the Editorial Board of this issue.

Prof. Dr. Aytekin İŞMAN
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AN APPLICATION OF PEER ASSESSMENT IN HIGHER EDUCATION

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ABSTRACT
The purpose of this study is to practice peer evaluation and to determine if the result of the evaluation shows similarity with the lecturer evaluation, thus to make assumption about the validity of peer evaluation in higher education. For this purpose, students of "Specific Teaching Methods I" class, which is included in the 3. Class of Department of Computer and Instructional Technologies Teaching, Gazi Faculty of Education, Gazi University, evaluated peers for their term project. In order to determine the similarity between peer and lecturer evaluation, the correlation between scores of lecturer and scores gained by peer evaluation is calculated. The result of the study revealed that peer evaluation showed similarity with lecturer evaluation.

KEY WORDS: Higher Education, Peer Evaluation, Validity

INTRODUCTION

In such a world, in which knowledge is progressively increasing and thus constructivist approaches are progressively becoming widespread; educators feel, and also researchers know, that classical evaluation methods fall behind in evaluation of active learning. The effect of this need forces educators to use active evaluation methods and also orients researchers to this area. Portfolios, performance evaluation, peer and self-evaluation are some of known alternative evaluation methods. However, in order these methods to be recognized and used effectively by educators, it is important to introduce the guiding principles and maintain high validity during implementation of these active evaluation methods.

As an alternative assessment method, peer evaluation is also utilized as a learning activity in addition to assess learning performance (Freeman, 1995). However, lecturers and students have some doubts about the validity level of evaluation, made by students, at the same knowledge level, about each other (Holroyd, 2000). This attitude seems to be an important barrier in front of use of peer evaluation. There is need for researches, revealing that, when it is implemented in a right way, peer evaluation demonstrates results, which are comparable with lecturer evaluation (Fry, 1990).

In this study, validity level of peer evaluation, when compared to lecturer evaluation, has been researched. For this purpose, students prepared a term paper for an end-term evaluation in 2007 Spring Term of "Special Teaching Methods I" class, which is included in the 3. Class of Department of Computer and Instructional Technologies Teaching, Gazi Faculty of Education, Gazi University and made peer evaluation. In order to determine the validity of peer evaluation, lecturer scores were taken as criteria and the correlation between lecturer scores and scores gained by peer evaluation was examined.

CONCEPTIONAL FRAMEWORK

In this chapter, some theoretical concepts, considered important in the scope of the study, have defined and basic features have been identified.

Peer Evaluation

Peer evaluation, considered as an alternative evaluation method, which includes both learning and evaluation, progressively attracts attention in higher education (Falchikov, 2001). This constitutes a parallelism with such recent improvements as cooperative learning, which attracts attention in higher education. Peer evaluation is described as an evaluation method, in which individuals evaluate each other according to certain criteria (Falchikov, 1995). In this evaluation method, students evaluate the quality of studies of their class-mates and provide feedback to each other (Van den Berg, Admiraal, and Pilot, 2006)

Advantages and Limitations of Peer Evaluation

Students interpret the studies of peers, while evaluating them, and thus they contribute to their own learning (Topping, 1998; Fallows, and Chandramohan, 2001). The advantages of peer evaluation in addition to increasing motivation of students for learning, are as follows: taking the responsibility of their own learning, making evaluation a part of learning, considering mistakes not as failure but as opportunity for re-learning, putting into practice the skills for knowledge transfer, using peer evaluation as a self-evaluation form, providing deep-learning instead of superficial learning (Brown, 1998). In addition to these, researchers indicate some important features of peer evaluation as follows (Zariski 1996; Van den Berg et. al., 2006):

- Evaluation is a part of learning
- Students become more autonomous, responsible and participative
- Students not only monitor the studies of others but also make some critical analysis
- The perspectives of the students are enriched with feedbacks
- During evaluation, students gains empathy
- Students' motivation for learning increases

On the other hand, some limitations of peer education are as follows (Brown, 1998, Magin and Helmore, 2001, Zariski 1996; Van den Berg et. al., 2006):

- Students may not have ability and maturity for evaluation
- Students may not take the evaluation seriously
- Students may have a negative attitude towards peer education
- Students may affect each other during evaluation
- Students may consider it as an additional burden

Validity in Peer Evaluation

The most important difficulty of peer evaluation is to be able to maintain the validity of evaluation at an acceptable level (Dochy et al., 1999). The most important way of ensuring this is to prepare clear and understandable criteria, to make evaluation by hiding the names or to use more than one peer evaluation for one study (Falchikov, 2001). The success of the evaluation is closely related with how much the students adopt criteria and process. It will be useful, if lecturers make student active in this process.

Topping (1998) reviewed studies on peer evaluation, made from 1980 till 1996 about many topics in higher education. He revealed that there was high correlation between lecturer evaluation scores and peer evaluation scores in twenty five studies of thirty one, which he reviewed. This demonstrates that the reviewed peer evaluations have a high validity. Similarly, Falchikov and Goldfinch (2000) reviewed forty eight studies of peer evaluation and found that peer evaluation results show similarity with lecturer evaluation results.

Points to be Paid Attention Concerning Peer Evaluation

Topping (1998) emphasized the importance of peer evaluation to be on time and personal in an effective peer evaluation process. Moreover, it is obvious that more quality peer evaluations will be more effective in learning. For example, Smith et al. (2002) reported that feedbacks as well as markings increase the transparency of the peer evaluation, self-confidence of the student and learning results. Topping (1998) stated that different types of feedbacks also have different effects on student and learning.

Peer evaluation can be made by hiding the names of evaluator and of the person, who is evaluated (Dochy, F., Segers, M. ve Sluijsmans, D. 1999). Thus, it is ensured that friendship relations affect evaluation results at minimum level. Peer evaluation can be made individually or in groups. If the evaluation is made by more than one evaluator, it will be more effective and consistent. The inconsistencies, still exist in evaluation results indicate, for educator, that there are problems in evaluation criteria and show that evaluator has some trouble with fair evaluation.

METHOD

In this chapter, information concerning the model, sample, tools for data collection, analysis and interpretation of the research is included.

Research Model

This study is a relation research, which has been designed for revealing, if similar results are gained when peer evaluation and lecturer evaluation are compared. For this purpose, the relation between peer evaluation figures, gained from students, and scores of lecturers is examined through correlation method. Peer evaluation scores and lecturer evaluation scores constitute the variables of the research.

Sample

This research was made on 48 students, who continue 3rd class at Department of Computer and Instructional Technologies Teaching, Gazi Faculty of Education, Gazi University in 2006-2007 Education Year Spring Term and take "Specific Teaching Methods I" classes.

Evaluation Activity

In this study, students developed web-based learning environments as a project. They first selected one of the strategies introduced in Specific Teaching Methods I class and then selected one topic included in primary school curriculum and after that they combined knowledge on developing story board and Dreamweaver programme, they gained during Authoring Language and Practices in Internet Environment classes. During the first two weeks of the project, students developed their story boards. During the following 3 weeks, they formed the first draft of the project and next week they presented it in the classroom and received feedbacks from peers and lecturers. Then during subsequent 3 weeks, they completed their projects. During the last two weeks, they presented the finalized version of their projects and peer evaluations were made. During this period, students were supported concerning participation in '1st National CITT Students General Assembly' with their projects in order to their share projects, they developed, with other students of Computer and Instructional Technologies Teaching Department and to be able to increase motivation level and students achieved degrees in the mentioned competition and won prizes.

Collecting and Analyzing Data

In this study, data was gained by using Student Peer Evaluation Form, which was prepared in the classroom with students. While developing the form, class discussion was executed and factors affecting the group work and project were taken into consideration. Ideas, gained as the result of discussion were classified and evaluation criteria were finalized.

Students filled the form at the end of term in electronic environment and sent them to the lecturers of the class through e-mail. These forms were gathered in a file in electronic environment. Then the evaluations, made by students and lecturer were transformed into scores in a scale of 100.

Peer evaluation scores and lecturer evaluation scores constitute the variables of the research. Both figures show continuity between one and a hundred. For the purpose of the study, the relation between these two continuous variables was examined by calculating Pearson Correlation Coefficients. It is appropriate to calculate Pearson Correlation Coefficient in order to find and interpret the amount of the relation between these two continuous variables (Büyüköztürk, 2005).

Peer Evaluation Form

Peer evaluation form is composed of two parts. It included 30 criteria, 12 were in the first part and 18 were in the second part.

In the 1st part, students evaluated performances of themselves and peers in term project study of OFD 394 Specific Teaching Methods class. Evaluation scale was composed of four units (0: very bad, 1: bad, 2: good, 3: very good) and included the following criteria:

1. Contribution to group meetings
2. Contribution to group discussions
3. Contribution to group works
4. Contribution to group decisions
5. Contribution to group harmony
6. Bear group responsibility
7. Cooperation and helping
8. Bear individual responsibility
9. Do one's duties
10. Behave one's friends positively
11. Contribution to the whole study
12. Would like to work in another project next time

In the 2nd part, students evaluated project products of other groups and of their own group. Evaluation scale was composed of four units (0: very bad, 1: bad, 2: good, 3: very good) and included the following criteria:

1. Use of technology
2. Design of interface
3. Practicability
4. Originality
5. Attractiveness
6. Appropriateness to the target group

7. Presentation of content
8. The related of instructional content and activities with the real life
9. Appropriateness to the instructional method(s), which were determined
10. Appropriateness to individual learning differences
11. Appropriateness to ethical values
12. Adequacy tools of interaction with lecturer
13. Adequacy of tools of interaction with other students
14. Adequacy of tools of determination of learning deficiencies and feedback
15. Adequacy of tools of self-evaluation
16. Adequacy of tools of source and learning support
17. Adequacy of tools of learning evaluation
18. The studies(s) you most liked

FINDINGS

The score distributions that the students have as a result of peer evaluation and lecturer evaluation are listed from low scores to the high and shown in Table 1 and Table 2 on 1/100 scale.

Table 1. Order of score, gained from peer evaluation.

43	55	70	78	88
43	56	71	80	90
44	60	72	80	90
44	61	73	83	92
48	62	73	84	92
48	62	74	84	96
49	66	74	86	100
50	66	75	87	100
54	66	76	87	
54	67	78	88	

Table 2. Order of score, gained from lecturer evaluation.

50	62	71	80	90
50	62	72	81	92
51	63	72	82	94
54	64	72	84	94
56	66	74	84	98
57	68	75	84	98
58	68	76	86	100
58	68	78	86	100
60	70	78	87	
62	70	80	88	

As it is seen in Table 3, the scores of peer evaluation ($\bar{x}$=71,22) are lower than the scores of lecturer evaluation ($\bar{x}$=74,43) by 2,21 scores on average. In both evaluations, the average figure appeared to be 73. However, the most frequently seen figure in peer evaluation is 66, whereas this came out 62 in lecturer evaluation. In lecturer evaluation (SS=14,08) the distribution of scores happened to have number ranges closer to each other, when compared to peer evaluation (SS=16,35). In peer evaluation, it appeared that scores were distributed in 57 score interval while this distribution range is 50 in lecturer evaluation. When the way of distribution is examined, as it is seen in Figure 1 and Figure 2, the scores that the students gained as a result of peer evaluation and lecturer evaluation were distributed in a normal way.

Table 3. Statistics on central tendency and central distribution of peer evaluation and lecturer evaluation score distributions.

	Peer Evaluation	Lecturer Evaluation
Number	48	48
Average	71,22	74,43
Median	73	73
Mod	66	62
Standard Deviation	16,35	14,08
Skewness	-,158	,087
Kurtosis	-,997	-,905
Range	57	50

Figure 1. Peer Evaluation score distribution histogram graphic.

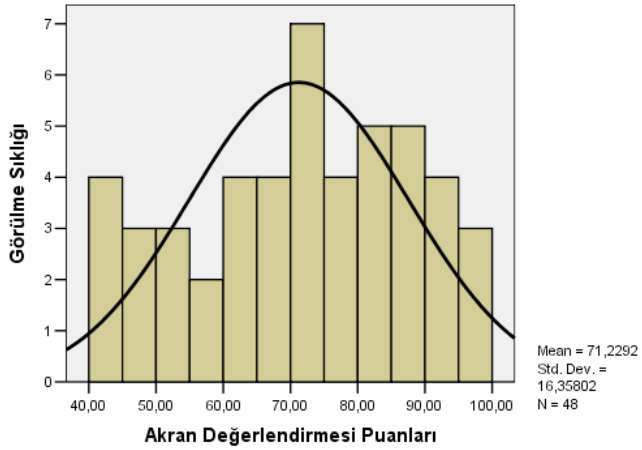
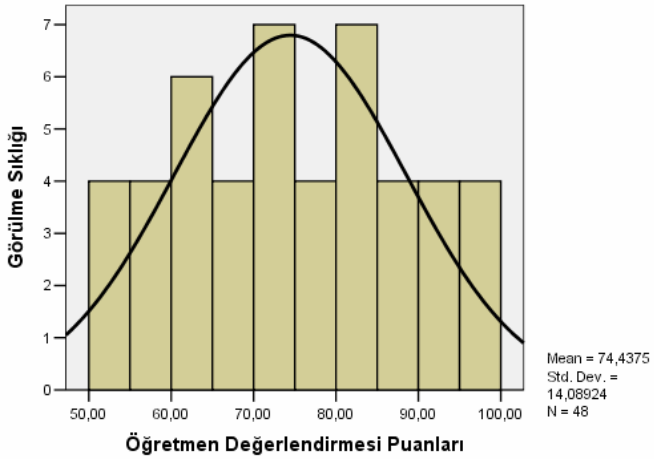


Figure 2. Lecturer Evaluation score distribution histogram graphic.



The relation between peer evaluation and lecturer evaluation was examined by calculating Pearson Correlation values through correlation method. As it is seen Table 4, there is high level relation, both positive and significant, between peer evaluation scores and lecturer evaluation scores ($r=0.991$, $p<.01$). Accordingly, students getting high scores from lecturers also get high scores from peers, and similarly students getting low scores from lecturers also get high scores from peers.

Table 4. The correlation between peer evaluation and lecturer evaluation.

		Peer Evaluation	Lecturer Evaluation
Peer Evaluation	Pearson correlation significance (2-directional)	1	,991
			,000
	N	48	48
Lecturer Evaluation	Pearson correlation significance (2-directional)	,991	1
		,000	
	N	48	48

DISCUSSION OF RESULTS

As a result of the research, when we consider the lecturer evaluations as reference, it can be stated that student peer evaluations show high similarity. This result supports the results of studies conducted earlier by Topping (1998) and Falchikov and Goldvich (2000). Topping (1998) revealed that that there was high correlation between lecturer evaluation scores and peer evaluation scores in twenty five studies of thirty one, he reviewed, moreover Falchikov and Goldfinch (2000) examined forty eight peer evaluation studies and found that peer evaluation results show similarity with lecturer evaluation results.

In conclusion, in the light of findings of this research, peer evaluation is suggested to the educators as an alternative evaluation method that can be applied more frequently in higher education. In practice, the importance of preparation of clear and understandable criteria, evaluation made without giving the names or using more than one peer evaluation for one study, should be taken into consideration (Falchikov, 2001). As for the success of the evaluation, it is important how much students adopt criteria and process. It will be useful if lecturers make student active in this process. In this context, criteria can be prepared together with students.

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INTERACTION IN THE INTERNET-BASED DISTANCE LEARNING RESEARCHES: RESULTS OF A TREND ANALYSIS

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ABSTRACT
In this research, the articles concerning interaction in the Internet-based distance learning, which were published in three most outstanding journals in 2003, 2004 and until March of 2005, have been examined and classified. The research provides opportunities for discussing topics, methods and some other variables. It is thought that, the research will be useful for reviewing current researching trends concerning interaction and displaying what kinds of potential researches about this topic can be done, and bringing up the deficiencies of the field.

Keywords: Interaction, internet-based distance learning, trend analysis

INTRODUCTION

As distance education theories reviewed, it will be seen that in almost all of them, for example in Wedemeyer's and Moore's *autonomy and independence* theories; in Holmberg's *interaction and communication* theory, in Moore's *transactional distance* theory; in Simonson's *equivalency* theory; in Paulsen's *cooperative freedom* theory, and even in the approach of Peratton, in which he emphasizes the uniqueness of distance education, usually the word "interaction" is mentioned. Lately, it is a fact that in the Internet-based distance learning researches the word "interaction" is seen by some how. Actually, although all of the theoreticians and practicians mention interaction, it is not so easy to find out the cues showing exactly how this interaction is implemented or should be implemented.

It is possible to see various definitions of interaction in the related literature. For instance, Lee and Gibson (2003) briefly define the interaction as *"reciprocal communication among the participants"*. On the other hand, Song (2003) expresses as "*interaction occurs between two or more people in order to explain point of views and conflicting points*". Garrison (1993) defines the web interaction as "*bilateral interaction of two or more people in a learning context*".

It is known that popularity of distance education has increased especially in the area of adult education. Distance learning has also been assessed as an appropriate option in the bachelor's and post graduate degrees. However, although there's no related official statistics, some anecdotal evidences and some institutions' own statistics show that completion and satisfaction rates of such courses are low (Russo & Campbell, 2004). Carr (2000) explains this situation as it will never be able to provide the personal interaction that starves learners for the lesson. As Russo and Campbell (2004) quoted the answer of the question "why is it so" is associated to the relevance of communication characteristics of the delivery medium; to weakness of the medium (Rice, 1993; Trevino, Lengel, & Daft, 1990); to scarcity of social cues (Culnan & Markus, 1987); to absence of the speech characteristics, such as tone of voice, intensity and speed, and non-verbal cues, which carry relational information, the text-based interaction that dominates online courses is unemotional and undersocial (Walther & Burgoon, 1992). This also decreases the satisfaction relating personal interest and interaction. If learners think that the online classes "are impersonal or isolated", they may cut off their physical or mental contacts with the given lesson (Russo & Campbell, 2004).

The purpose of this work is bringing up the trends related with Interaction in the Internet-based distance learning in order to try to find out the missing cues in the researches about implementation as mentioned above. It is also witnessed that similar trend analysis are conducted in the related literature. For instance, Lee, Driscoll, and Nelson (2004) have made content analysis about the past, present and future of distance education researches between the years 1997-2002. Similarly, Lee et al. (2004) state that Berge and Mrozowski (2001), based on the Sherry's (1995) categorization system, Anglin and Morrison (2000), and Koble and Bunker (1997) have also conducted trend analysis about distance education.

When glancing at the table called as "Distance Education Research Specific Topics by Key Word" in the research by Lee et al. (2004), it will be seen that in the 278 articles that they reviewed, the rate of the exactly key word "interaction" is 9.4% (26 articles), the rate of the key words "collaboration", "learner's satisfaction" and "videoconferencing", which are thought to be in an indirect relation with interaction, is in total 14.4% (40

articles) and the general sum of both the key word "interaction" and the key words indirectly related with interaction is 23.74% (66 articles), and this rate is almost equal to ¼ of all of the articles that were reviewed. This shows how vital is interaction for distance education.

METHOD

In this research, these three journals -*American Journal of Distance Education* (AJDE)*, Quarterly Review of Distance Education* (QRDE) and *Distance Education* (DE) - have been reviewed because they are prominent journals of this field, because they had also been chosen in other trend analysis researches and because they are reachable in the online data base of Gazi University Library (the researcher studies in this university). Because of the reason that EBSCOHost Academic Search Premier, an online data base reached from Gazi University Library, allow the oldest common date for full text searching these three journals is 2003, and the upper time limit for them is 12 months prior to the day the study is conducted (March, 2005), so the articles between 2003 and March 2005 have been examined and 25 of them, that are about interaction in Internet-based distance learning, have been reviewed. The distribution of these articles is presented in Table 1.

Table 1: Distribution of the Reviewed Articles According to Years and Journals

	2003		**2004**		**2005**		
	Volume (Issue)	**n (%)**	**Volume (Issue)**	**n (%)**	**Volume (Issue)**	**n (%)**	**Total**
AJDE	17(1)-17(4)	4 (16%)	18(4)	1 (4%)	19(1)	1 (4%)	6 (24%)
QRDE	4(3)-4(4)	4 (16%)	5(2)-5(3)	4 (16%)	6(1)	1 (4%)	9 (36%)
DE	24(1)-24(2)	5 (20%)	25(1)-25 (2)	5 (20%)	--	--	10 (40%)
Total		13 (52%)		10 (40%)		2 (8%)	25 (100%)

For the period of 2003-2005, totally 6 articles in AJDE (Volume 17 Issue 1-Volume 19 Issue 1), totally 9 articles in QRDE (Volume 4 Issue 3-Volume 6 Issue 1) and totally 10 articles in DE (Volume 24 Issue 1-Volume 25 Issue 2) have been reviewed.

Classification

Lee et al. (2004) developed a new kind of topic classification system, based on the categorization systems of Sherry (1995), Phipps and Merisotis (1999), and Khan (1997): This system is consists of design-related, development-related, management-related, evaluation-related, institutional and operational-related, and theory and research-related topics. In this research, a title, called "combination of topics", has been added in addition to the titles that take place in the classification system, which was developed by Lee et al. (2004). This newly formed topics classification method is summarized in Table 2.

Table 2. Classification of Topics

Topic	design-related topics	development-related topics	management-related topics	evaluation-related topics	institutional and operational-related topics	theory and research-related topics	combination of topics
Explanation	• needs assessment • course scheduling • course design • instructional strategy development • course material design • visual design	• course support system and material development • web-based learning management system building • online tools development • online testing system development	• learning resource management • troubleshooting, • attrition rate • faculty and staff support • learner support • technical support	• program quality control • assessment of learning outcomes • benefits and cost analysis • return on Investment • evaluation of supporting system	• administration • academic affairs • accreditation • certification • policy • payment • budgeting	• distance education theory building • review of literature • introduction to new research methods • culture and gender issues • learning style • history of distance education • copyright law	• a study synthesizing two or more topics

Lee et al. (2004) base their new categorization system that they formed for research method to the categorization system of Berge and Mrozowski (2001), of Koble and Bunker (1997), of Anglin and Morrison (2000), and of Klein (2002). The system is also used in this research, is composed of design-related, development-related, management-related, evaluation-related, institutional and operational-related, and theory and research-related topics. This classification system is shown in Table 3.

Table 3. Classification of Research Methods

Research Method	Explanation
theoretical inquiry	a theoretical review of literature and conceptual study for proposing new ideas in distance education
experimental research	a study examining the effect of independent variable(s) on dependent variable(s)
case study	a study aimed at investigating a single individual, group, program, or organization, qualitatively
evaluation research	a study aimed at determining the impact of project, program, model, or software
developmental research	a study aimed at designing, developing, and evaluating an existing or newly developed model, process, product, or technique
survey research	a study addressing the distribution and return of responses in a nonexperimental situation
combination of inquiries	a study synthesizing two or more research methods

RESULTS

The distribution of the topics in the reviewed articles according to years and journals are shown in Table 4. According to this table, while no article was found under the titles of design topics, management topics and institutional and operational-related topics, under the title of development topics, one each articles (4%) have been reviewed in 2003 and 2004. One of these articles was published in QRDE, while the other one was published in DE journal. Of the 13 articles (52%) that are assessed under the title "evaluation topics", 5 (20%) were published in 2003, 6 (24%) were in 2004 and 2 (8%) were in 2005. AJDE and DE shared four each and QRDE shared five of them. The number of articles which exists under the title "theory and research topics", both were published in 2003 and one of them was published in QRDE, while the other one was published in DE, is only 2 (8%). Nevertheless, 5 (20%) of 8 (32%) articles containing more than one topic, fall to 2003 and 3 (12%) of them fall to 2004. 2 (8%) of these 8 articles are in AJDE, 2 (8%) of them are in QDRE and 4 (16%) of them are in DE. It is observed that the reviewed articles have been categorized mostly under the title of evaluation topics, and most of them have been published in the year 2004, and most of them were published in the journal DE. In general, the reason of the fact that the minimum number of articles were published in the year 2005 stems from the inability of reviewing that year entirely.

Table 4. Distribution of Topics According to Years and Journals

Years/Journals / Topics	2003	2004	2005	Total	AJDE	QRDE	DE	Total
design-related topics	--	--	--	--	--	--	--	--
development-related topics	1 (4%)	1 (4%)	--	2 (8%)	--	1 (4%)	1 (4%)	2 (8%)
management-related topics	--	--	--	--	--	--	--	--
evaluation-related topics	5 (20%)	6 (24%)	2 (8%)	13 (52%)	4 (16%)	5 (20%)	4 (16%)	13 (52%)
institutional and operational-related topics	--	--	--	--	--	--	--	--
theory and research-related topics	2 (8%)	--	--	2 (8%)	--	1 (4%)	1 (4%)	2 (8%)
combination of topics	5 (20%)	3 (12%)	--	8 (32%)	2 (8%)	2 (8%)	4 (16%)	8 (32%)
Total	13 (52%)	10 (40%)	2 (8%)		6 (24%)	9 (36%)	10 (40%)	

The distribution of research methods according to years and journals are listed in Table 5. According to that, of the 3 (12%) articles which used the theoretical inquiry method, 2 (8%) were published in QRDE, and 1 (4%) was published in DE. Of the totally 6 (24%) articles, which were assessed as "experimental research", 2 (8%) were published in 2003, and the other 4 (16%) were published in 2004. Distribution of these articles according to journals is as follows: 1 (4%) in AJDE, 2 (8%) in QRDE and 3 (12%) in DE. It is witnessed that mostly the "case study" method was opted in the researches. This method was used in 7 articles (28%) in 2003, two each (8%) in 2004 and in 2005. Distribution of these articles according to journals is: four each (16%) in AJDE and DE; and 3 (12%) in QRDE. It is seen that, the only article (4%) which used the "survey research" method was published in DE, in 2004. One article (4%) in 2003 and 3 (12%) articles in 2004 were assessed as "combination of inquiries". Of these 4 (16%) articles, one each (4%) were published in AJDE and QRDE, and 2 (8%) were published in DE. There are no articles which were appraised as "evaluation and developmental research". Most of these articles were published in 2003, while the minimum number of those articles was published in 2005. Again, this may be explained with the scarcity of the articles that were reached in 2005.

Table 5. Distribution of Research Methods According to Years and Journals

Years/Journals / Research Methods	2003	2004	2005	Total	AJDE	QRDE	DE	Total
theoretical inquiry	3 (12%)	--	--	3 (12%)	--	2 (8%)	1 (4%)	3 (12%)
experimental research	2 (8%)	4 (16%)	--	6 (24%)	1 (4%)	2 (8%)	3 (12%)	6 (24%)
case study	7 (28%)	2 (8%)	2 (8%)	11(44%)	4 (16%)	3 (12%)	4 (16%)	11 (44%)
evaluation research	--	--	--	--	--	--	--	--

developmental research	--	--	--	--	--	--	--	--
survey research	--	1 (4%)	--	1 (4%)	--	--	1 (4%)	1 (4%)
combination of inquiries	1 (4%)	3 (12%)	--	4 (16%)	1 (4%)	1 (4%)	2 (8%)	4 (16%)
Total	13 (52%)	10 (40%)	2 (8%)		6 (24%)	8 (32%)	11 (44%)	

In the researches, percentage, ANOVA, discourse analysis, factor analysis, frequency, content analysis, MANOVA, t test, open-ended questions, z test, cross table, multiple regression, structural equation modeling, correlation, Pillai's trace and two-way contingency table were used as statistical methods. As also seen in Table 6 percentage, ANOVA, factor analysis, content analysis, t-test and correlation were most frequently used ones among these methods.

Table 6. Distribution of the Statistics Used in the Researches According to Years and Journals

Years/Journals / Statistics	2003	2004	2005	AJDE	QRDE	DE	Total
Percentage	1	3	1	1	2	2	5
ANOVA	1	2	--	--	1	2	3
Discourse analysis	--	--	1	--	1	--	1
Factor analysis	2	2	--	--	1	3	4
Frequency	--	2	--	--	--	2	2
Content analysis	1	2	--	1	1	1	3
MANOVA	--	1	--	--	1	--	1
t test	1	2	--	1	--	2	3
Open-ended questions	1	1	--	--	1	1	2
z test	1	--	--	1	--	--	1
Cross table	--	1	--	--	--	1	1
Multiple regression	1	1	--	--	--	2	2
Structural equation modeling	--	1	--	--	--	1	1
correlation	1	2	--	--	--	3	3
Pillai's Trace	--	1	--	--	--	1	1
Two-way contingency table	1	--	--	--	1	--	1

It has been found out that in the reviewed articles the data collection tools like survey, interview, examination of discussions, open-ended questions, close-ended questions, scale, rubric, DAT, TAT, observation, and field notes were used: Of these methods, most frequently used ones are survey (6 articles – 24%) and interview (4 articles – 16%). The distribution of data collecting tools can be seen in Table 7.

Table 7. Distribution of Data Collecting Tools According to the Publications

Instruments	**n**
Survey	6
Interview	4
Examination of discussions	2
Open–ended questions	2
Close–ended questions	2
Scale	3
Rubric	1
DAT	1
TAT	1
Observation	2
Field Notes	1

As the number of the participants is examined in the reviewed articles; there can be seen 13 articles that used participants between numbers 1-100, 3 between 101-200 and 3 articles, more than 200. On the other hand, the number of participants that were participated in the researches was not mentioned in 3 articles. In those researches, 4 of the distributed courses were about foreign language, 1 was about religion, 9 were about

education, and 10 of them were about various themes. Meanwhile, it was not mentioned what the distributed course was about in 2 researches. One of the presented courses was adult education, one was in-service training, 9 were on the graduate degree, another 9 were on undergraduate degree and 2 were on the high school level. In 2 researches, no information was given about the level of the course. On the other hand, as the countries where the researches were conducted is examined, it is understood that 9 of them were done in the USA, 4 were in Canada, each two were in Korea and Australia, and each one were conducted in Egypt and Trinidad & Tobago. When assessed from the point of examined messages, it is seen that, 1 article examined less than 1000 messages, while 4 of them examined messages between 1000-10.000. There are 3 articles in which number of messages is not declared.

The articles concerning interaction vary among each other by variables as seen in Table-8. These variables may be listed as follows: gender, satisfaction, access, transactional distance, Garrison's Comprehensive Model, cultural differences, time, transporting message (in communication), linguistic barriers, motivation and intention, instructional design, high-level thinking skill, cognitive load, self-direction, experience of technology, capabilities of technology, dominant style, individual differences, course necessities, differences of using media, and task design.

Table 8. Distribution of the Variables Concerning Interaction According to the Publications

Variable	n	Variable	n	Variable	n
Gender	1	Linguistic Barriers	1	Dominant style	2
Satisfaction	2	Motivation and intention	1	Individual differences	1
Access	1	Instructional design	1	Course necessities	1
Transactional Distance	2	High-level thinking skill	1	Differences of using media	1
Garrison's Comprehensive Model	1	Cognitive load	1	Task Design	1
Cultural Differences	1	Self-direction	1		
Time	2	Experience of technology	2		
Transporting message (in communication)	1	Capabilities of technology	2		

The types of the software that were used in these researches were also reviewed and distribution of these software is summarized in Table 9. According to that, it is seen that learning management system software or forum software such as, first of all, WebCT, and besides Blackboard, FirstClass, vClass, WiredClass, Quick Messenger, Centra (a synchronous text-based chat software) and SiteScape Forum, or web page editors such as FrontPage, or content analysis software, such as Transcript Analysis Tool (TAT) are used.

Table 9. Distribution of the Software Used in the Researches According to the Publications

Software	Blackboard	Centra	FirstClass	TAT	FrontPage	SiteScape Forum	vClass	WebCT	WiredClass	Quick Messenger	RealAudio
n	2	1	2	1	1	1	1	5	1	1	1

It is seen that various interaction types are mentioned in the reviewed articles. Table 10 shows that the most mentioned interaction types as social, learner-instructor, learner–learner and learner–content interactions.

As the learners' Internet-based learning experiences are examined, it is seen that five each of the articles were published in 2003 and 2004, and two articles were published in 2005. Two each of them were published in

AJDE and QRDE, while eight of them were published in DE. Learners' experiences took place in 9 of them, especially in one of them an average of 2.6 years of learners' experiences took place. In one of these articles experienced and inexperienced learners were categorized in different groups, but in another article it has been mentioned that the learners did not have any experience.

Table 10. Distribution of Interaction Types According to the Publications

Interaction	Social	Learner-instructor	Learner-learner	Learner-content	Learner-interface	Psychological	Learner/instructor-tools	Learner–media	Learner–knowledge	Learner-institute or staff
n	9	17	19	12	4	1	1	1	1	1

The length of application periods have also been reviewed in these 25 articles. Table 11 shows that, the most preferred period is one semester (8 researches) among the studies.

It is seen that 16 of these articles examined the interaction in an online discussion environment. It has been determined only in four of experimental researches blended learning was practiced among all of them.

Table 11. Distribution of the Application Periods According to the Publications

Time	1 semester	1 week	2 semesters	8 and 15 weeks	3 semesters	4 semesters	4weeks	7-8 weeks
n	8	1	2	1	1	1	2	1

DISCUSSION

As the results of this research are scrutinized, it is seen that publications related to interaction were most frequently conducted in the *years* 2003 (52%) and 2004 (40%). The reason of the scarceness of the researches conducted in 2005 (8%) is that, it could not be possible to reach all of the articles published in 2005. These articles are mostly publicated in DE (40%) and QRDE (36%) journals, while the number of articles in AJDE is relatively few (24%). "Evaluation" (20%) is studied mostly as *topic*, while the topics "management" and "institutional and operational-related" are not studied at all. The "design" topic is assessed as "combination of topics", since it was studied with other topics. Among the *research methods*, the most studied method is "case study" (44%); on the other hand "evaluation" and "developmental" methods have been studied together with other methods. The least studied method is "survey" (4%).

The most used *statistical techniques* are percentage and factor analysis. These techniques are followed by ANOVA, content analysis, the t-test and correlation. The most preferred data collecting tools are surveys and semi-constructed interviews. In most of them, they have worked with less than 100 participants.

In the researches, researchers have not opted for a certain *course*, though; they have mostly concentrated on education. Applications have been generally conducted in 1 *semester*. Researches have been mostly performed in *USA*. The mostly used *software* is WebCT.

Interaction is reviewed as its relation with different *variables*. The three *types of interaction* (learner-learner/instructor/content) that mentioned by Moore (Moore & Kearsley, 2005) and social interaction themes

have also been dealt with. It is seen that Distance Education is the journal which has mostly mentioned learners' *previous e-learning experiences*.

Methodological deficiencies of the researches are another important point For example, in some of the articles, there are no information about the course topic, or the level of the course, or in which country the application is managed, or number of the participants that participated in the application, or, if any online discussion has been executed, the quantity of the reviewed messages, or what kinds of software(s) were used.

As a general look at the researches is taken, such a question comes to mind: "Does the fact that the learners were of graduate education, have an effect on such an intensive interaction?" In other words, because the learners' educational levels are high, it might have an effect in their success in interaction. Another question in mind is: "Can, courses given in the studies be evaluated as student centered (in other words: students being satisfied and benefiting from the optimum level of interaction that is provided) as it is related to the learners' experiences of distance learning?" However, similarly it brings in mind such a question like "Is it necessary of the instructors' experiences, or not?" Naturally, the most critical function in performing the interaction, in organizing the environment, and in coaching learners belongs to the instructor.

CONCLUSION

The distribution of the articles (except for editorials, book summaries, and etc.) in the mentioned journals (American Journal of Distance Education, Quarterly Review of Distance Education and Distance Education) in the mentioned periods (2003, 2004 and until March 2005) can be seen in Table 12. According to this, totally 138 articles have been published; 37 of them are in AJDE, 72 in QRDE, and 29 in DE. 25 of these articles are about interaction in the Internet-based distance learning. In other words, the percentage of interaction theme in all of the articles reaches 18% approximately. It is thought that, if the researcher was able to reach all of the articles that were published in 2005, the rate would have been higher. Anyway, even this rate alone is high enough and even this number underlines the significance of this subject in the related literature.

Table 12. Total Number of Articles That Were Published In These Journals

AJDE	n		QRDE	n		DE	n
19(1) - Mar2005	4		6(1) - Spring2005	9		26(1) - May2005	2
18(4) - Dec2004	4		5(4) - Winter2004	7		25(2) - Oct2004	6
18(3) - Oct2004	4		5(3) - Fall2004	9		25(1) - May2004	7
18(2) - Jul2004	3		5(2) - Summer2004	6		24(2) - Oct2003	7
18(1) - Mar2004	5		5(1) - Spring2004	8		24(1) - May2003	7
17(4) - Dec2003	4		4(4) - Winter2003	10			
17(3) - Sep2003	5		4(3) - Fall2003	10			
17(2) - Jul2003	4		4(2) - Summer2003	7			
17(1) - Mar2003	4		4(1) - Spring2003	6			
Total	37		**Total**	72		**Total**	29

Nevertheless, there is indefiniteness in the related literature. While social; learner-instructor; learner-learner; learner-content are frequently mentioned as types of interaction, number of studies concerning the implementation of these interaction types are very few. The designers especially emphasize the significance of the learner-content type of interaction, however, indefiniteness of implementation of these methods create hardness for the practitioners. On the other hand, the fact that practitioners do not share their experiences (if they have any) with the literature, do not ease the efforts of theoreticians in determining the required standards, in this field. Sims (2003) also emphasizes this point, when he quotes the comment of Kristof and Satran (1995):

"… Interaction is the use of new areas by the people, when they improve ideas, information and arts, in the same way with their usual methods, when they communicate with each other. The essence of a good interactive communication is a strong message and an open presentation. Creativeness and an able implementation are still desired, in the designing process. Here, the new variable is the option of the target audience …"

It is envisaged that the results of this trend analysis contain outcomes that will be useful for expanding the future studies in this area. Besides, it is thought that even the enlargement of this work or its repetition with other topic titles may alone become a new research subject.

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THE ABILITIES OF PHYSICAL EDUCATION TEACHERS IN EDUCATIONAL TECHNOLOGIES AND MULTIMEDIA

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ABSTRACT
In the field of education, information and communication technologies and multimedia tools have become more prevalent then ever that almost all schools can obtain. Physical education which is not only very important component of formal and informal education but also an important part of lifelong learning has been affected by these developments and physical education teachers has begun to use educational technologies and multimedia. On the other hand, because of some reasons like lack of technical facilities and inadequate in-service training, educational technologies and multimedia tools are either not used in physical education classes or used ineffectively. In this study, how often and which educational technologies and multimedia tools are used by physical education teachers and – if there are – the reasons for ineffective use of these tools are investigated. Moreover, based on the findings of the study, some suggestions for physical education teachers to use educational technologies better are made.
Key Words: Educational technology, Multimedia, Physical education teachers

INTRODUCTION

Rapid developments in electronic technology have made important effects on education systems in the world. It is doubtless that new technology has affected both economical system and social and education system. People who plan the future education have to know where this technology inclines to and act considering this (Akkoyunlu, 2002; Jones, 1997).

Technology is a powerful mean to reform schools, increase students' success and make education effective (Equilin, 2004). Software and Information Industry Association in the USA published a 135-page-report called "Effectiveness of Technology at Schools 2000 Report" in 2000 and analyzed the results of quality researches, PhD. Thesis and 300 professional magazines about educational technology in the report. This report showed how the technology increased the students' success, developed students' trust and attitude to learning and how it developed the effectiveness between students and teachers in the education atmosphere (Zhu, 2003).

Students learn to know the abilities of other people in their lives and their own abilities with the help of pysical education to satisfy some feelings which are innate like winning, losing, racing. Students also learn to accept losing, to respects others rights to help each other, duty and responsibility in an appropriate way in different practical atmospheres. Because of this, in modern education system, physical education and sport are important means which aim to make people ready for life according to the expectations of their societies.

It is obvious from the definition that expectations from physical education and sport are huge and the width of the area they affect is remarkable. It will be a limited thinking to apply this without using technology and it will decrease its effectiveness.

EDUCATIONAL TECHNOLOGY AND MULTIMEDIA

The term educational technology is used as the design, development, practice and evaluation of the system, method, materials in order to get effective results and develop human's learning process. Throughout the history, the terminology about educational technology developed related to others like educational technology, distant education learning with computer (Hedberg and McNamara, 2002).

In he 18th century, Rousseau (1762/1933) claimed that the most effective and social learning took place b interaction of students with the nature and natural environment. With regard to this meaning educational technologies provide the students with organized and modified atmosphere and provide their interaction with nature in an artificial way.

Many technology supported educational environments are in the form of natural environments' simulation. This enables the students to make a correspondence between their own projects and the real existing problems and this also makes an authentic learning possible (Winn, 2002). Cuban (1993), argues that rapid spread of educational technology is related to three factors; a) getting the students well prepared for the growing demand for technology workforce b) the potential of computer in learning individually c) the belief that using computer in the classroom will increase the productivity.

Societies are transforming from industrial culture in to port modern culture. Post modern society is changing rapidly and the sides affecting each other in the society cannot depend on once-learned curriculum or educational content. They have to act in the bigger knowledge masses and they also have to organize the knowledge the need. Multimedia tools and internet are media which perform to make it easier to access that big knowledge masses. These needs of modern societies are among the main reasons for using multimedia in educational environments (Witfelt, 2000).

In today's world, by stating modern education we mean environments which have no place limitation and which contribute to the development of individuals regardless of place and time. In order to be sure of efficiency, this contribution must be very fast using all the technological innovations and it must be joyful and must meet the requirements of the contemporary world.

According to Scolnick, Larson and Smith (1993) today's generations are brought up with the technologies of video, audio and computer. Multimedia technologies are arousing the interests of these generations. At first, educational ethnology was regarded only as the application of communication media. The effect of media, especially the television, on the behavioral change and its educational use has been gone over (Levie, 1978).

In this context, in our time we mainly mean the ones related to computers, intranet, internet technologies and World Wide Web when w talk about educational technology (Assiri, 2003). The rapid improvements in the computer technology have made the lesson activities easier for students and have increased their motivation.

The students can cooperate with the students from other classrooms or the other schools an can do the projects through internet (Mohnsen, 2001; Sheingold and Hadley 1990). For instance the forums on the internet can increase the group interaction and WebPages can make the students reach huge piles of information easily. The use of e-mail is a beneficial way for informal communication between teachers as well (Knapper, 2001). The use of internet in the field education provides the information to spread fast improves communicative and writing skills and facilitates motivation for learning.

In today's world computers can both run the software faster and they offer quality service in terms of graphics and video. By the help of using such multimedia tools it can be said that psychomotor skills can improve in addition to the cognitive ones. Moreover, multimedia technology has facilitative effects on the analysis of motor skills for physical education (McKethan and Everhart, 2001).

THE USE OF TECHNOLOGY AND MULTIMEDIA IN PHYSICAL EDUCATION

In the history of various country's cultures physical education has served people for differing purposes. Since the primitive ages, physical activities have played an important role in the society formally or informally. Physical activities have been needed for a number of reasons; such as, defense, environmental factors and continuing the lives. In some other situations, the most important motive for physical activity has been the longing for a more quality life (Bird, 1998).

It was found that the use of technology in physical education programs increased the motivation to materials offered and learning (Thornburg and Hill, 2004). Physical education teachers have started to be enthusiastic n using the technology together with the potential of the internet in their class. The results of the studies showed that the use of technology in physical education as a teaching tool could be useful for both the teachers and the students. Technology offers the atmosphere which can provide students autonomous learning. That is, it provides a learning environment where the students more actively involve in learning process (Thornburg and Hill, 2004). Most of the students consider taking responsibility in their own learning as more motivating (Witfeld, 2000).

In addition to being an educational tool, the understanding and acquiring the skills will be accomplished after applying the technology in teaching process effectively. Technology must be seen as a way to facilitate learning and improving interaction with the students (Thurnburg and Hill, 2004). From this point of view, the use of technology in physical education can be regarded as a factor teaching both theoretical information and psychomotor skills, improving interaction and increasing motivation.

PHYSICAL EDUCATION TEACHERS AND EDUCATIONAL TECHNOLOGY

By using technological developments and internet in an organized way; students, teachers, athletes and trainers, doctor and patient may come together eve if they are in different countries. Using WebPages, teleconference, e-mail and Msn, schools can be more than being just a building with walls and can become something that has a

connection with every phase of life. The methods like Msn, pps and video might provide education to be more effective and enjoyable.

However, in the related studies it is stated that educational technologies are not meaningful alone, they cannot be used as the only teaching method, they cannot take the place of teachers.

Today, educators should use technology o be able to find the source o elated studies at least. Hansen and Witfelt (1999) stated that teachers should have o abilities: technology literacy and technology/multimedia ability. These abilities should use the educational technologies at the user level and this level includes using multimedia applications, comprehending and adjusting the screens, using the search facilities and so forth. Besides, it is necessary to use some specific software and simulations for teaching; this is a job that needs interest and time (Shephard, 2004).

American Office of Technology Assessment emphasized that technological expenses will not be effective even if the teachers get the proper education and support. In the 1998 yearly report, 4 conditions were mentioned for teacher education in technology application: Teachers,

-Should be educated in using the technology,
-They should get the necessary training and support to have an understanding and a vision on the role of technology in education.
-They should be backed up in their trial of innovations.
-They should have time for learning and practice (Office of Technology Assessment, 1988).

Adequate in service training may help to solve the problems related with time, education and support which are the important factors of using technology in the class. The teachers who get the education during previous education stages before beginning the profession will be more successful in using the technology in their class (Smarkola, 2004)

One of the biggest difficulties in using the educational software and multimedia technologies more commonly is that the the teachers' not feeling comfortable with technology (Electronic education report, 2002). According to social cognitive theory and proformance models there are personal, behavioral and environmental factors affecting the teachers' use of technology. Zhu (2003), adapted these factors from Dusick (1998) and described as the following in the study named "The Application of Computer Technology at State Schools":

a. Personal and behavioral factors; opinions, conformity with the knowledge and topic, attitude, personal ability, computer ability, experience in teaching and expertise.
b. Environmental factors: Education and workshop support from managers and colleagues, accessing the sources.

THE AIM OF THE STUDY
The aim of the study is to determine the level of the use of educational technology of physical education teachers working in Turkey.

THE POPULATION
The population of the study consists of the physical education teachers in Turkey.

DATA COLLECTION
The data used in the study was collected with the scale named "Use of Educational Technology Questionnaire". The questionnaires were applied at the in service training courses in Çanakkale dated 20.06.2005 and in Mersin dated 10.10.2005 to the physical education teachers form 81 provinces of Turkey.

THE QUESTIONNAIRE
The questionnaire was prepared by the researcher in order to determine the use of educational technologies taking the specialists opinions on the issue. Six questions at the beginning were related with the personal information of the teachers and the latter 58 questions were related with the level of educational technology use.

There are totally 64 questions in the questionnaire. The validity and reliability of the questionnaire as provided. The opinions of the specialists were taken for validity. As for reliability, the reliability coefficient cronbach alpha was found to be, 9516.

The Statistical Method of the Study

In the study qualitative and quantitative research methods were used. In order to check if there are differences according to sex, educational status and in service training t-test; for the other variables One Way ANOVA were applied using the SPSS.

Demographical Situations of the Cases

Table 1. Sex of the Physical Education Teachers Who Took The Survey

1.	24 %	(46 people)	woman
2.	76 %	(145 people)	man

In the study the demographical situations of the teachers were determined. As it can be seen in the Table 1 the 24 % (46 people) of the cases are women, 76 % (145 people) of the cases are men.

Table 2. Age of the Physical Education Teachers Who Took The Survey

1.	4,2 %	25 and below	(8 people)
2.	35,4 %	26-30	(68 people)
3.	46,4 %	31-35	(89 people)
4.	5,7 %	36-40	(11 people)
5.	7,8 %	41 and older	(15 people)

% 4.2 (8 people) of the physical education teachers who took the survey is at the age of 25 years old and below, % 35.4 (68 people) is between 26-30, % 46.4 (89 people) is between 31-35, % 5.7 (11 people) is between 36-40 and % 7.8 (15 people) is 41 years old and older.

Table-3 Years In Service of Physical Education Teachers Who Took The Survey

1.	% 18,2	0-5 years	(35 people)
2.	% 58,3	6-10 years	(112 people)
3.	% 13,5	11-15 years	(26 people)
4.	% 4,7	16-20 years	(9 people)
5.	% 3.6	20 years and more	(7 people)

As seen in Table 3 the years in service of physical education teachers who took the survey is % 18.2 (35 people) for 0-5 years, % 58.3 (112 people) for 6-10 years, % 13.5 (26 people) for 11-15 years, % 4.7 (9 people) for 16-20 years and % 3.6 for 20 years and more.

Tablo-4 Place of Work of Physical Education Teachers Who Took The Survey

1.	% 73,4	Province	(141 people)
2.	% 20,3	District	(39 people)
3.	% 5,2	Town	(10 people)

% 73.4 (141 people) of the physical education teachers who took the survey work in the provinces, while % 20.3 (39 people) of them work in the districts and % 5.2 (10 people) work in towns.

Tablo-5 Educational Background of Physical Education Teachers Who Took The Survey

1.	%89,1	Bachelor's Degree	(171 people)
2.	%9,4	Master's Degree	(18 people)

% 89.1 (171 people) of them have Bachelor's Degree and % 9.4 (18 people) have Master's Degree.

Tablo-6 In-Service Training of Physical Education Teachers Who Took The Survey On Instructional technologies and Material Development

1.	% 34,9	(67 people)	Yes
2.	% 60,9	(117 people)	No

% 34.9 (67 people) of the physical education teachers who took the survey have received in-service training about instructional technologies and material development, on the other hand % 60.9 (117 people) haven't received such an in-service training course.

FREQUENCIES

Blackboard: % 3.7 (7 people) of the physical education teachers who took the survey stated that they never use the blackboard; whereas % 59.13 (112 people) of them said that they use it rarely, and % 58 (53 people) claimed to use it regularly, finally % 9 (17 people) stated that they use it frequently.
Graphics: % 42.2 (76 people) of the physical education teachers who took the survey stated that they never use graphics; on the other hand % 43.3 (78 people) of them said that they use them rarely, and % 12.8 (23 people) claimed to use them on regular basis, finally % 1.7 (3 people) stated that they use graphics frequently.
Large Picture: % 33.7 (61 people) of the physical education teachers who took the survey stated that they never use large pictures; whereas % 47 (85 people) of them said that they use them rarely, and % 16.6 (30 people) claimed to use them regularly, finally % 2.8 (5 people) stated that they use them frequently.
Book: % 3.8 (7 people) of the physical education teachers who took the survey stated that they never use books; on the other hand % 42.6 (49 people) of them said that they use them rarely, and % 50 (91 people) claimed to use them on regular basis, finally % 19.2 (35 people) stated that they use books frequently.
Billboard: % 6.7 (12 people) of the physical education teachers who took the survey stated that they never use the billboard; whereas % 19.6 (35 people) of them said that they use it rarely, and % 46.9 (84 people) claimed to use it regularly, finally % 26.8 (48 people) stated that they use it frequently.
Cartoons: % 44.3 (77 people) of the physical education teachers who took the survey stated that they never use cartoons; on the other hand % 39.7 (49 people) of them said that they use them rarely, and % 50 (91 people) claimed to use them on regular basis, finally % 19.2 (35 people) stated that they use cartoons frequently.
Internet: % 12.2 (23 people) of the physical education teachers who took the survey stated that they never use the Internet; whereas % 24.5 (47 people) of them said that they use it rarely, and % 32.8 (63 people) claimed to use it regularly, finally % 29.2 (56 people) stated that they use it frequently.
www Page: % 28.8 (51 people) of the physical education teachers who took the survey stated that they never use ww pages; whereas % 23.2 (47 people) of them said that they use them rarely, and % 29.9 (53 people) claimed to use them regularly, finally % 18.1 (32 people) stated that they use them frequently.
Internet Camera: % 68.2 (120 people) of the physical education teachers who took the survey stated that they never use Internet Cameras; whereas % 17 (30 people) of them said that they use them rarely, and % 6.8 (12 people) claimed to use them on regular basis, finally % 6.3 (11 people) stated that they use them frequently.
Chat: % 61.9 (109 people) of the physical education teachers who took the survey stated that they never use chatting; on the other hand % 25 (44 people) of them said that they use it rarely, and % 6.8 (12 people) claimed to use it regularly, finally % 6.3 (11 people) stated that they use it frequently.
Teleconference: % 78 (135 people) of the physical education teachers who took the survey stated that they never use teleconference; whereas % 13.3 (23 people) of them said that they use it rarely, and % 4.6 (8 people) claimed to use it on regular basis, finally % 4 (7 people) stated that they use it frequently.
Search Engine: % 51.7 (90 people) of the physical education teachers who took the survey stated that they never use search engine; on the other hand % 21.3 (37 people) of them said that they use it rarely, and % 15.5 (27 people) claimed to use it regularly, finally % 11.5 (19 people) stated that they use it frequently.
Television: % 14.5 (27 people) of the physical education teachers who took the survey stated that they never use television; whereas % 30.1 (56 people) of them said that they use it rarely, and % 35.5 (66 people) claimed to use it regularly, finally % 19.9 (37 people) stated that they use it frequently.
Video: % 23.9 (44 people) of the physical education teachers who took the survey stated that they never use video; whereas % 28.8 (53 people) of them said that they use it rarely, and % 35.3 (65 people) claimed to use it on regular basis, finally % 12 (22 people) stated that they use it frequently.
CD: % 30.4 (56 people) of the physical education teachers who took the survey stated that they never use CDs; on the other hand % 21.2 (39 people) of them said that they use them rarely, and % 34.8 (64 people) claimed to use them on regular basis.
Film: % 34.3 (62 people) of the physical education teachers who took the survey stated that they never use films; whereas % 32.6 (95 people) of them said that they use them rarely, and % 26 (47 people) claimed to use them regularly, finally % 7.2 (13 people) stated that they use them frequently.
Video Camera: % 41.8 (74 people) of the physical education teachers who took the survey stated that they never use video cameras; on the other hand % 32.8 (58 people) of them said that they use them rarely, and % 18.6 (33 people) claimed to use them regularly, finally % 6.8 (12 people) stated that they use them frequently.
Radio: % 64.6 (113 people) of the physical education teachers who took the survey stated that they never use radios; whereas % 18.9 (33 people) of them said that they use them rarely, and % 10.3 (18 people) claimed to use them regularly, finally % 6.3 (11 people) stated that they use them frequently.
Cassette Player: % 38.6 (68 people) of the physical education teachers who took the survey stated that they never use cassette players; whereas % 26.1 (46 people) of them said that they use them rarely, and % 22.2 (39 people) claimed to use them regularly, finally % 13.1 (23 people) stated that they use them frequently.

Over-Head Projector: % 38.6 (68 people) of the physical education teachers who took the survey stated that they never use over-head projectors; whereas % 26.1 (46 people) of them said that they use them rarely, and % 22.2 (39 people) claimed to use them regularly, finally % 13.1 (23 people) stated that they use them frequently.
Slides: % 73.8 (124 people) of the physical education teachers who took the survey stated that they never use slides; on the other hand % 16.7 (28 people) of them said that they use them rarely, and % 7.1 (12 people) claimed to use them regularly, finally % 2.4 (4 people) stated that they use slides frequently.
Windows: % 20.9 (38 people) of the physical education teachers who took the survey stated that they never use windows; whereas % 24.2 (44 people) of them said that they use it rarely, and % 28 (51 people) claimed to use it regularly, finally % 26.9 (49 people) stated that they use it frequently.
DOS: % 63 (104 people) of the physical education teachers who took the survey stated that they never use DOS; whereas % 18.8 (31 people) of them said that they use it rarely, and % 13.3 (22 people) claimed to use it regularly, finally % 4.8 (8 people) stated that they use it frequently.
Powerpoint: % 34.4 (63 people) of the physical education teachers who took the survey stated that they never use powerpoint; on the other hand % 35 (64 people) of them said that they use it rarely, and % 19.1 (35 people) claimed to use it regularly, finally % 11.5 (21 people) stated that they use it frequently.
Excel: % 28.6 (52 people) of the physical education teachers who took the survey stated that they never use excel; whereas % 34.6 (63 people) of them said that they use it rarely, and % 25.8 (47 people) claimed to use it regularly, finally % 11 (20 people) stated that they use it frequently.
Scanner: % 39 (71 people) of the physical education teachers who took the survey stated that they never use scanner; on the other hand % 35.2 (64 people) of them said that they use it rarely, and % 17.6 (32 people) claimed to use it regularly, finally % 8.2 (15 people) stated that they use it frequently.
Digital Camera: % 43.2 (76 people) of the physical education teachers who took the survey stated that they never use video; whereas % 27.3 (48 people) of them said that they use it rarely, and % 18.8 (33 people) claimed to use it regularly, finally % 10.8 (19 people) stated that they use it frequently.
CD-ROM: % 33.9 (60 people) of the physical education teachers who took the survey stated that they never use CD-ROM; whereas % 24.3 (43 people) of them said that they use it rarely, and % 26.6 (47 people) claimed to use it regularly, finally % 15.3 (27 people) stated that they use it frequently.
Data Show: % 61.8 (107 people) of the physical education teachers who took the survey stated that they never use data show; whereas % 23.7 (41 people) of them said that they use it rarely, and % 9.2 (16 people) claimed to use it regularly, finally % 5.2 (9 people) stated that they use it frequently.
Multimedia: % 56.2 (100 people) of the physical education teachers who took the survey stated that they never use multimedia; on the other hand % 24.7 (44 people) of them said that they use it rarely, and % 12.9 (23 people) claimed to use it regularly, finally % 6.2 (11 people) stated that they use it frequently.
Printer: % 20.6 (37 people) of the physical education teachers who took the survey stated that they never use printers; whereas % 19.4 (35 people) of them said that they use them rarely, and % 27.8 (50 people) claimed to use them regularly, finally % 32.2 (58 people) stated that they use them frequently.
Laptop: % 69.8 (134 people) of the physical education teachers who took the survey stated that they never use laptops; whereas % 10.9 (21 people) of them said that they use them rarely, and % 9.9 (19 people) claimed to use them regularly, finally % 9.4 (18 people) stated that they use them frequently.
Narration: % 5.9 (11 people) of the physical education teachers who took the survey stated that they never use narration; whereas % 28.3 (53 people) of them said that they use it rarely, and % 47.6 (89 people) claimed to use it regularly, finally % 18.2 (34 people) stated that they use it frequently.
Discussion: % 4.3 (8 people) of the physical education teachers who took the survey stated that they never use discussion; on the other hand % 23.4 (43 people) of them said that they use it rarely, and % 57.6 (106 people) claimed to use it regularly, finally % 14.7 (27 people) stated that they use it frequently.
Sample Situation: % 3.7 (7 people) of the physical education teachers who took the survey stated that they never use sample situation; whereas % 5.9 (11 people) of them said that they use it rarely, and % 55.6 (104 people) claimed to use it regularly, finally % 34.8 (65 people) stated that they use it frequently.
Demonstration: % 1.1 (2 people) of the physical education teachers who took the survey stated that they never use demonstration; whereas % 2.1 (4 people) of them said that they use it rarely, and % 27.1 (52 people) claimed to use it regularly, finally % 68.1 (131 people) stated that they use demonstration frequently.
Problem Solving: % 7.2 (13 people) of the physical education teachers who took the survey stated that they never use problem solving; on the other hand % 20 (36 people) of them said that they use it rarely, and % 42.8 (77 people) claimed to use it regularly, finally % 30 (54 people) stated that they use it frequently.
Group-work: % 2.7 (5 people) of the physical education teachers who took the survey stated that they never use group-work; whereas % 9.6 (18 people) of them said that they use it rarely, and % 41.2 (77 people) claimed to use it regularly, finally % 46.5 (87 people) stated that they use it frequently.
Experimentation: % 4.8 (9 people) of the physical education teachers who took the survey stated that they never use discussion; whereas % 24.7 (46 people) of them said that they use it rarely, and % 45.2 (84 people) claimed to use it regularly, finally % 25.3 (47 people) stated that they use it frequently.

Computer Laboratory: % 56.5 (100 people) of the physical education teachers who took the survey stated that they never use computer laboratory; on the other hand % 27.7 (49 people) of them said that they use it rarely, and % 10.7 (19 people) claimed to use it regularly, finally % 5.1 (9 people) stated that they use it frequently.
Science Laboratory: % 83 (146 people) of the physical education teachers who took the survey stated that they never use science laboratory; whereas % 11.9 (21 people) of them said that they use it rarely, and % 3.4 (6 people) claimed to use it regularly, finally % 1.7 (3 people) stated that they use it frequently.
Research: % 18.7 (34 people) of the physical education teachers who took the survey stated that they never use research; on the other hand % 36.8 (67 people) of them said that they use it rarely, and % 37.9 (69 people) claimed to use it regularly, finally % 6.6 (12 people) stated that they use it frequently.
Discovery: % 41.7 (75 people) of the physical education teachers who took the survey stated that they never use discovery; whereas % 28.9 (52 people) of them said that they use it rarely, and % 21.1 (38 people) claimed to use it regularly, finally % 8.3 (15 people) stated that they use it frequently.
Reinforcement: % 18.8 (34 people) of the physical education teachers who took the survey stated that they never use reinforcement; on the other hand % 24.3 (44 people) of them said that they use it rarely, and % 37 (67 people) claimed to use it regularly, finally % 18.8 (36 people) stated that they use it frequently.
Reward: % 5.9 (11 people) of the physical education teachers who took the survey stated that they never use reward; whereas % 10.8 (20 people) of them said that they use it rarely, and % 40.5 (75 people) claimed to use it regularly, finally % 42.7 (79 people) stated that they use it frequently.
Clue: % 10.9 (20 people) of the physical education teachers who took the survey stated that they never use clues; whereas % 28.4 (52 people) of them said that they use them rarely, and % 41.5 (76 people) claimed to use them regularly, finally % 19.1 (35 people) stated that they use clues frequently.
Feedback: % 14.9 (27 people) of the physical education teachers who took the survey stated that they never use feedback; on the other hand % 29.3 (53 people) of them said that they use it rarely, and % 32.6 (59 people) claimed to use it regularly, finally % 23.2 (42 people) stated that they use it frequently.
Brain Storming: % 12.8 (23 people) of the physical education teachers who took the survey stated that they never use brain storming; whereas % 29.1 (52 people) of them said that they use it rarely, and % 38 (68 people) claimed to use it regularly, finally % 20.1 (36 people) stated that they use it frequently.
Question-Answer: % 4.3 (8 people) of the physical education teachers who took the survey stated that they never use question-answer; on the other hand % 9.6 (18 people) of them said that they use it rarely, and % 53.5 (100 people) claimed to use it regularly, finally % 32.6 (61 people) stated that they use it frequently.
Role-play: % 13.2 (24 people) of the physical education teachers who took the survey stated that they never use role-play; on the other hand % 26.4 (48 people) of them said that they use it rarely, and % 36.3 (66 people) claimed to use it regularly, finally % 24.2 (42 people) stated that they use it frequently.
Simulation: % 14.8 (27 people) of the physical education teachers who took the survey stated that they never use simulation; whereas % 21.3 (39 people) of them said that they use it rarely, and % 39.9 (73 people) claimed to use it regularly, finally % 24 (44 people) stated that they use it frequently.
Educational Games: % 1.6 (3 people) of the physical education teachers who took the survey stated that they never use educational games; on the other hand % 3.8 (7 people) of them said that they use them rarely, and % 24.5 (47 people) claimed to use them regularly, finally % 66.7 (128 people) stated that they use educational games frequently.
Practice: % 3.2 (6 people) of the physical education teachers who took the survey stated that they never use practice; whereas % 10.8 (20 people) of them said that they use it rarely, and % 24.3 (48 people) claimed to use it regularly, finally % 61.6 (114 people) stated that they use it frequently.
Role-play: % 13.2 (24 people) of the physical education teachers who took the survey stated that they never use role-play; on the other hand % 26.4 (48 people) of them said that they use it rarely, and % 36.3 (66 people) claimed to use it regularly, finally % 24.2 (42 people) stated that they use it frequently.
Behavioral Approach: % 8 (14 people) of the physical education teachers who took the survey stated that they never use behavioral approach; whereas % 27.4 (48 people) of them said that they use it rarely, and % 42.3 (74 people) claimed to use it regularly, finally % 22.3 (39 people) stated that they use it frequently.
Cognitive Approach: % 11.7 (20 people) of the physical education teachers who took the survey stated that they never use cognitive approach; on the other hand % 29.2 (50 people) of them said that they use it rarely, and % 42.1 (72 people) claimed to use it regularly, finally % 17 (29 people) stated that they use it frequently.
Contructivist Approach: % 12.4 (21 people) of the physical education teachers who took the survey stated that they never use constructivist approach; whereas % 25.9 (44 people) of them said that they use it rarely, and % 46.5 (79 people) claimed to use it regularly, finally % 15.3 (26 people) stated that they use it frequently.

STATISTICAL ANALYSES

After the percentages of using educational technologies of physical education teachers are found out, it was uncovered whether any difference exists according to gender, age location of service, years spent in service, level of education, and whether in-service training has been taken or not. T-test method was used for age, level

of education, and in-service training, while for other variables ANOVA was preferred. There, the alpha value (α) was taken as 0.05. Comparative analyses were conducted according to this value.

T-Test Gender Analysis
The values for which the alpha value is <0.05 are as below according to the analysis conducted.
-Educational Games 0.043
-Practice 0.003
-Behavioral Approach 0.004

Conclusion: According to this result, female teachers use the above educational technologies meaningfully more compared to male ones at the level of $p<0.05$.

T-Test Educational Level Analysis
The values for which the alpha value is <0.05 are as below according to the analysis conducted.
-Narration 0.035
-Problem-solving 0.006

Conclusion: According to the result above, teachers who have completed their master's degree use narration and problem solving methods meaningfully more compared to those who haven't at the level of $p<0.05$.

T-Test In-Service Training Analysis
The values for which the alpha value is <0.05 are as below according to the analysis conducted.
-Large Picture 0.044
-CD 0.007
-Film 0.001
-PowerPoint 0.048
-Discovery Method 0.005
-Clue 0.049
-Cognitive Approach 0.018

Conclusion: According to their result, teachers who have taken in-service training use the educational technologies above meaningfully more compared to those who haven't at the level of $p<0.05$.

ANOVA Results for The Age Variable
Results Obtained At The Level of $p<0.05$:

-The Use of Books 0.033
According to the LSD test results, people at the age of 25 or below use the book meaningfully more than those between 36-40, those at the age of 25 and below than those at the age of 41 and above, and finally those between 31-35 than those between 36 and 40.
-Group-work 0.003
According to the LSD test results, people at the age of 41 and older use the group-work meaningfully more than those 25 and below, those between 31-35 than those between 36-40 and 25 and below, those between 26-30 than those between 36-40 and at the age 25 and below.
-Individual Study 0.001
According to the LSD test results, people at the age of 25 or below use the individual study meaningfully more than those between 26-30 and 36-40, those between 31-35 than those between 36-40, and finally those 41 and older than those between 36 and 40.

ANOVA Results for Years in Service
Results Obtained At The Level of $p<0.05$:

-Large Picture 0.020
According to the results of LSD test teachers who worked 11-15 years use large pictures meaningfully more than teachers who worked 0-5 years and 6-10 years.
-Book 0.047
According to the results of LSD test teachers who worked 0-5 years use books meaningfully more than teachers who worked 16-20 years and 6-10 years use it meaningfully more than 16-20 years.
-Search Engines 0.030

According to the results of LSD test teachers who worked 11-15 years use search engines meaningfully more than teachers who worked 6-10 years and 16-20 years.

-Discussion Method 0.012

According to the results of LSD test teachers who worked 6-10 years use discussion method meaningfully more than teachers who worked 0-5 years and 11-15 years use it meaningfully more than 0-5 years.

-Demonstration Method 0.049

According to the results of LSD test teachers who worked 6-10 years use demonstration method meaningfully more than teachers who worked 16-20 years.

-Problem Solving Method 0.026

According to the results of LSD test teachers who worked 6-10 years use problem solving method meaningfully more than teachers who worked 0-5 years; 11-15 years use it meaningfully more than 0-5 years and 21 and more years use it meaningfully more than 0-5 years.

-Individual Studying Method 0.017

According to the results of LSD test teachers who worked 6-10 years use individual studying method meaningfully more than teachers who worked 11-15 years and 16-20 years; and 21 and more years use it meaningfully more than 16-20 years.

-Research Method 0.008

According to the results of LSD test teachers who worked 6-10 years use research method meaningfully more than teachers who worked 0-5 years and 21 and more years use it meaningfully more than 16-20 years.

-Behavioral Approach 0.006

According to the results of LSD test teachers who worked 0-5 years use behavioral approach meaningfully more than teachers who worked 6-10 years, 16-20 years and 21 and more years.

COMPARISON OF THE AVERAGES

Certain analyses were conducted based on the general classification levels of the technologies used. The aim of these analyses is to determine how frequently the teachers use educational technologies of that specific level. Therefore, the existing educational technologies were divided into 6 groups as Technologies with Basic Structure, Internet Based Technologies, Audio Visual Technologies, Computer Technologies, the Dimension of Learning-Teaching Methods, and the Theoretical Dimension.

T-Test Results for Gender Variable (Dimension of Learning-Teaching Methods)

Gender	*N*	*X*	*S*	*Sd*	*T*	*p*
Female	67	2,9020	,44736	,05465	2,214	,028*
Male	116	2,6324	,51090			

The analyses conducted show that woman use learning methods meaningfully more than men at the level of $p<0.005$.

ANOVA Results for the Variable of Years in Service (Theoretical Dimension)

The Source of Variance	**The Total of Squires**	**Sd**	**The Averages of Squires**	**F**	**p**
Inter-groups	**5,514**	**4**	**1,378**	**2,526**	**,043***
Inner-groups	**92,231**	**169**	**0,546**		
Total	**97,745**	**173**			

At the end of the analysis, a result at the level of $p<0.05$ was obtained. The results of LSD test carried out to find out which groups this figure originates from are as follows:

Years in Service	**N**	**Average**
0-5	**32**	**247,71**
6-10	**103**	**109,47**
11-15	**104**	**102,71**
16-20	**9**	**1,9630**
21 ve üzeri	**6**	**2,5556**

According to the results of LSD test teachers who worked 0-5 years use behavioral, cognitive and constructivist approaches meaningfully more than teachers who worked 16-20 years, 6-10 years use it meaningfully more than 16-20 years, and finally 11-15 years use it meaningfully more than 16-20 years at the level of $p<0.05$.

CONCLUSION AND SUGGESTIONS

In this study, the level of educational technology usage of 46 female and 145 male physical education teachers working in various cities of Turkey was studied and changes in these teachers' usage of educational technology. Besides, changes in these teachers' usage of technology according to gender, level of education, age, in-service training and years in service are studied.

T-test was implemented according to gender, in-service training and educational level of individuals who participated in the study. When studied in terms of their gender, it is found that female teachers use technologies of educational games (p=0.043), practice (p=0.003) and behavioral approach (p=0.004) meaningfully more than male ones.

As to the level of using educational technologies of physical education teachers on graduate and graduate level, it can be said that teachers with a master's degree use narration technology on the level of p=0.035 and problem-solving technology at the level of p=0.006 more than undergraduate teachers. T-test results about in-service training of physical education teachers who participated in the study show that physical education teachers who took in-service training use large picture (p=0.044), CD (p=0.007), film (p=0.001), PowerPoint (p=0.048), discovery (p=0.005), clue (p=0.049), cognitive approach (p=0.018) meaningfully more than those who did not take in-service training.

When we take the physical education teachers' level of using educational technologies according to their age trails, we see that there is a meaningful difference between age groups in book usage on the level of p=0.033, group-work on the level of p=0.003 and individual study on the level of p=0.001. Mostly the age group of 25 and below use books, the group of 41 and above use group study and teachers at the age 25 and below use individual study technique.

The most meaningful difference about the level of using educational techniques of physical education teachers was found in years in service. According to the ANOVA conducted according to the years in service of physical education teachers, meaningful difference was found in large pictures (p=0.020), book (p=0.047), search engines (p=0.030), discussion (p=0.012), demonstration (p=0.049), problem-solving (p=0.026), individual study (p=0.017), research (p=0.008), behavioral approach (p=0.006).

An average score was obtained from the responses of individuals related to their level of using educational technology and this average score was studied according to the individuals' demographic characteristics. According to the analyses, it is found that physical education teachers' level of using educational technologies differs according to their gender and years in service.

A meaningful difference was found in the level of p=0.28 ($p<0.05$) according to t-test conducted between the average scores of physical education teachers about gender and educational technology usage. Female physical education teachers (X=2.9020) use educational technologies more than male teachers (X=2.6324).

ANOVA was used in order to study the relation between teachers' years in service and average scores they get from educational technologies. According to the ANOVA, a meaningful difference was found among groups on the level of $p>0.043$. Those teachers who worked for 0-5 years were the group that used educational technologies most (X=247.71) and those who worked for 21 years and more were the group that used them most (X=2.5556).

The methods that physical education teachers most frequently use are demonstration and educational games. Such methods bear importance since they address to all the senses. However, it is also necessary that technological facilities be included in education and teaching activities and adapt to the developing technology by means of various training activities. To achieve this, physical education teachers must be provided with tutorial CDs about the lessons covered and it is necessary that materials used by the teachers less frequently such as data-show, CD, over-head projector, be used during this process. It is certain that students' success will increase in a lesson supported by audio-visual materials.

Computer technology provides people with unbelievable facilities thanks to the simulation programmes developed in recent years for example, a programme produced in the area of physical education may enable us to reach a decision by assessing various possibilities at once such as how much a athlete with a certain amount of weight, whose data is put into the computer can exercise and to which level they can succeed and reduce the risk of injuries.

We have a comprehensive, interactive, three–dimensional simulation programme on human anatomy. With this programme the data of your athlete or student are loaded and all the possibilities required so that they can achieve the expected physical and motor development are tested, and thus the results can be obtained in shortest time with minimal loss.

From now on, a lifestyle interconnected with and in line with technology and it is essential that we use and spread the use of the technological tools, which utilize the opportunities and possibilities that make life easier, and which save time.

As we can do sports at every age, technology can also be used. It will be appropriate to add lifelong technology and technology at every age to sports slogans like "lifelong sports and sports for everybody" and to reflect these in their lifestyles.

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THE EFFECTS OF INDIVIDUAL DIFFERENCES ON LEARNER'S NAVIGATION IN A COURSEWARE

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ABSTRACT
One of the major features of a computer based instruction (CBI) is its non-linear structure allowing learners the opportunity of flexible navigation to accommodate their own needs. However, this non-linear structure may cause problems such as inefficient navigation, being lost or cognitive overhead for some learners. The aim of this study is to determine how individual differences; cognitive styles, prior knowledge and gender influence the navigation pattern in a courseware. The research has the posttest-only, equivalent-groups true experimental design. The sampling is comprised of 84 first year undergraduate students at Gazi University, enrolled in an introduction to computer course. The cognitive styles (field dependent/ field intermediate/ field independent) of the students were measured with the "Group Embedded Figure Test". To determine the navigation pattern of the students, their stratum, compactness and revisit percentage values were computed based on their use of the courseware developed for the research. According to the findings, there is a statistically significant difference between learners' compactness and revisitation scores based on their cognitive styles. Also, there is a significant difference in revisitation scores based on the participants' prior knowledge.
***Keywords**:* Cognitive Styles, Navigation, Computer Based Instruction, Stratum, Compactness, Revisitation.

INTRODUCTION

Designing instructional environments according to the user's needs has been the focus of instructional designers (Summerville, 1999; Raven, Cano, Garton, & Shelhamer, 1993). Individual differences are related with how people are similar and how they are differ in their thinking, feeling and behaviour. So educators and instructional designers have to attempt to understand and identify the influences of individual differences on learning to maximize the efficiency of instruction. The effects of individual differences on learning are examined through a large body of educational research. Due to these researches, some learning and/or cognitive styles have been classified over the years. One of the most well known and accepted cognitive style is *field dependence/field independence* developed by Witkin et al. (1977).

Witkin found that individuals are likely to differ considerably in their behaviors from basic perception to career preferences. Witkin and his associates developed the concept of "field dependence/independence" and defined it as the typical method of processing information (Ayersman and Minden, 1995). Field dependence is related to the "degree to which a learner's perception or comprehension of information is affected by the surrounding perceptual or contextual field" (Jonassen and Grabowski, 1993). There are numerous studies on the characteristics of field dependent and field independent learners. For example, Triantafillou, Pomportsis, Demetriadis and Georgiadou (2004) explained these characteristics as field dependent (FD) students are successful regarding interpersonal skills, whereas field independent (FI) learners are more autonomous. Moreover, FD students are globally oriented and have low ability for cognitive restructuring skills. On the other hand, FI students think more analytically and have highly developed cognitive restructuring skills than FD students. There is a continuum between extreme field dependence and independence, with those of intermediate ability being called field intermediate or field neutral (Mancy and Reid, 2004).

Park and Hannafin (1993) emphasized that learning environments can be as functional as to the extent that they are adapted to individual learner needs. Computer based instruction (CBI) provides users a variety of diverse content and learning tools in different contexts matched with learner preferences and knowledge level. Alomyan (2004) defined one of the main features of computer based learning as "the non-linearity where individuals have the freedom to choose their learning paths allowing them to have more control over their learning". These features and many others have increased the popularity of the CBI as a way of delivering instruction" (Shih and Gamon, 2001).

Achieving and processing information in non-linear environments is different from the traditional environments, because non-linearity allows users to jump between units of information in a non-predetermined order (Kim, 1998; Alomyan, 2004). While nonlinearity provides flexibility and freedom, some learners cannot control the pace and sequence of instruction, and find the relevant information on the CBI without getting lost (Chen, 2002). Therefore, educators should be more concerned with "how learners navigate through CBI systems and how individual differences can predict those paths" (Chen and Macredie, 2002). Also, Graff, 2003 found that "Cognitive style is related to an individual's ability to detect his/her spatial location or orientation in space". Therefore, cognitive style is an important factor of one's navigation in computer based instructional systems.

Students with different prior knowledge may be focused on different pieces of content and may choose different navigation path (Brusilovsky, 2003). Prior knowledge shows the learners' knowledge and skills on the content which they acquire from their experiences. Learners try to relate their prior knowledge with new information in learning process (Chi et al., 1989). Educational research insistently claims that what a student previously knows and how this information is organized influences the process of learning new information (Jonassen and Grabowski, 1993). The relationship between a student's prior knowledge and his/her navigation should be considered.

Another impact on the navigation path can be gender of learners. For example, Ford and Chen (2000), in their study, found that relative to males, females made fewer requests for guidance in navigation. According to Lawton (1994), there are gender differences in self-reported use of different way finding strategies. Therefore it is important to point out the effects of gender on navigation paths in CBI.

The most consistent trend in developing a better understanding of users' navigation patterns under hyperdocuments is to analyze the navigation trails (McEeneaney, 2001). The structure of any hyperdocument or a navigation trail can be modeled with some theories as graph theory (Broder et al., 2000). Directed or weighted directed graphs can be constructed based on the visited pages and followed links which represented by nodes and the edges (Herder and Van Dijk, 2004). By using the navigation graphs, some useful numerical metrics (stratum, compactness, revisitation rate, path density etc.) are proposed to help analyze the behaviors of users in their navigations. The measures which can be useful in assessing and modeling users navigation have been examined by some researchers (Gwidzka and Spense, 2007; Herder and Juvina, 2004; McEneaney, 2001; etc.). For example, Herder and Juvina (2004) stated that styles in the navigation paths can be determined using the strategies followed by the users. They used some metrics as stratum, compactness, path density and average connected distance, etc. to characterize user navigation styles. They found two different navigation styles called as flimsy and laborious navigation that predict users' perceived disorientation.

There are also some studies examining the relationship between a student' characteristics (gender, learning style, prior knowledge, cognitive style and computer experience, etc.) and navigation (Alomyan, 2004; Eveland and Dunwoody, 1998; Ford and Chen, 2000; Lawless and Kulikowich, 1998; Reed and Oughton, 1997, etc.) For example, Chen and Macredie (2002) suggested that field independent individuals would prefer free navigation, and field dependent individuals need guided navigation in non-linear learning. Eveland and Dunwoody's study (1998) indicated that novices tend to make use of a linear structure in hypermedia systems, while experts tend to navigate non-linearly. Although Vila, Beccue and Anandakar (2003) found that gender has no effect on the way subjects navigate in Virtual Reality, Ford and Miller (1996) claimed that women were relatively disoriented.

Even though there are many studies about navigation in hyper documents, the relationship among individual differences and navigation patterns has not been researched fully or the implications have been inconclusive. This study aims to examine whether individual differences, cognitive style, prior learning and gender, influence the stratum, compactness and revisitation scores of learners' navigation in CBI. To determine this, the following questions were posed:

1. Are there significant differences among a students' stratum, compactness and revisitation scores based on their cognitive styles (field independent, field intermediate, and field dependent)?
2. Is there a significant difference between the participants with high and low prior knowledge for their stratum, compactness and revisitation scores?
3. Is there a significant difference between male and female learners for their stratum, compactness and revisitation scores?

METHODOLOGY

The design of the research is posttest-only, equivalent-groups true experimental. The true experimental studies are accepted as strongest design even though it is difficult to conduct in school environments. Thus, this design is offered to be used for every research as much as possible (Best and Kahn, 1993).

Subjects

This study was conducted in the Departments of Art Education and History Education in the Faculty of Education at Gazi University with the participation of 84 undergraduate students. The participants consisted of students enrolled in the "*Introduction to Computer*" course during the first semester of the 2006-2007 school year. The sampling includes 34 males and 50 females. 25 students were field dependent, 28 students were field intermediate and 31 students were field independent.

Materials

Computer Based Instruction Program

A computer based instruction tool was developed to teach the word processing software "Microsoft Office Word XP". It included texts, images, captured videos, animations and interactive practices which were combined in a software developed using Microsoft Visual Basic 6.0. Videos were recorded using "Camtasia 2.0" and converted to swf (Shockwave Flash) format for embedding into the tool. The interactive practices and animations were also made using Macromedia Flash MX.

The complete courseware consisted of five chapters and 68 pages which were connected to each other. In the introduction section of the each chapter, there were three screens of advance organizers such as animations presenting the preview of a chapter, identifying texts about the objectives of the chapter and a concept map of the chapter. Another component of the tool was a multiple choice test including twenty items developed to inform learners about their academic achievement.

The courseware had four main parts:

1) A title bar which showed the location of the user in the subject sections, and includes "help" and "close" buttons.
2) An index tool (content outline) which had a hierarchical structure.
3) The main area which presented the contents.
4) A menu bar included all components of the software to access various facilities such as moving between pages, taking notes, and so on.

The general view of the software was showed in Fig. 1.

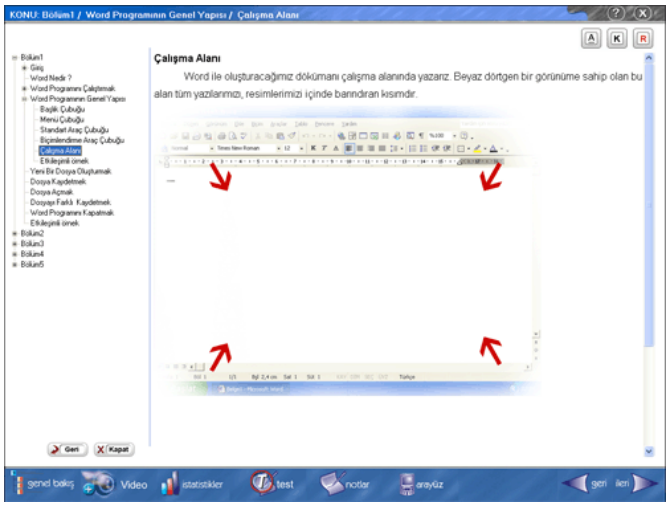

Figure (1). Screenshot of Courseware

The students could follow a linear path through the software using "next" and "previous" buttons on the menu system. The software also included an index tool which made it possible to follow a nonlinear path, and the students were able to jump freely from one page to another. There was also another "back button" on the index tool, which made possible returning to the previous page when a non-linear path had been followed.

Instrument

Cognitive styles analysis

The Group Embedded Figure Test (GEFT) was used to determine the cognitive styles of the students as field dependent, field intermediate or field independent (Witkin, Oltman, Raskin, and Karp, 1971). GEFT was an adaptation of the EFT (**E**mbedded **F**igures **T**est) which was developed in 1950 to determine the field dependence of groups by Witkin, Oltman, Raskin and Karp (1971) and translated to Turkish by Okman Fişek (1979). GEFT had a reliability coefficient of 0.82 and was a standardized paper-pencil test, which measured visual perceptiveness. It was based on the ability to identify a simple geometric shape which was embedded in complex figures, in a limited time, and included 25 items divided into three parts. The first part was for practice and was not evaluated. In this test, there were 7 complex figures in the first section whereas the second and third sections included 9 complex figures. The range of the scores in the GEFT varied from 0 to 18, where each correct answer evaluated by one point. The low and high scores which were determined by using the values of arithmetic mean and standard deviation indicated the individual's field dependence and field independence.

Measurement of stratum, compactness and revisitation percentage

Most of the theoretical studies on the hyperdocuments are often based on the idea of characterizing pages and links between the pages on a hyperdocument with the directed graphs. On such a mathematical model, it is easier to define some useful metrics or measures to make interpretation on the structural attributes of a hyperdocument or a navigation on the hyperdocument such as connectedness or linearity (Blondel and Van Dooren, 2003; Egghe and Rousseau, 2003). It can also be made some iterative computations on the matrix representations of the directed graphs, such as algorithms to determine the hubs and authorities in web searching (Blondel et al., 2004; Kleinberg, 1999).

The stratum and compactness concepts were introduced by Botafago and friends in 1992. They indicate whether a natural order for reading the texts in hypermedia exists by using combined some other metrics for identifying hierarchies in a hyperdocument. If the stratum approaches zero, the hyperdocument goes away from the linear structure, and vice versa. Stratum value of a uniform linear structured hypermedia is 1. The directions of the links have no importance on such a linear structure in terms of stratum. In Figure 2, diagrams of some example hyperdocuments are illustrated with their measured stratum values.

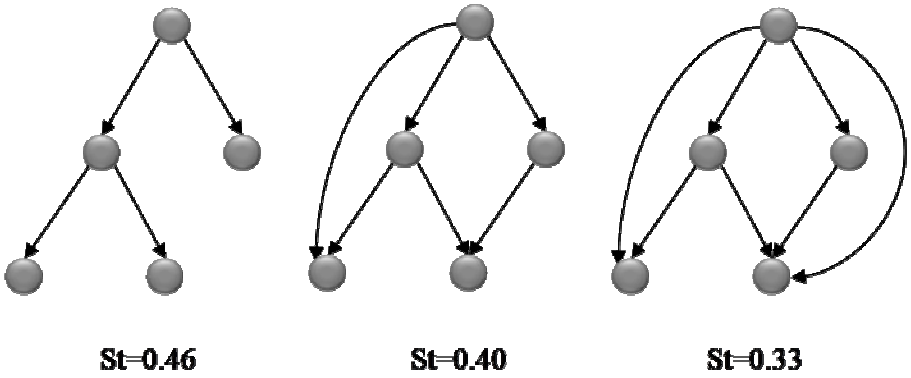

Figure (2). The stratum measure

Compactness measure can be expressed in free of nonessentials, as an indication of the intrinsic connectedness of a hyperdocument. In a complete disconnected hyperdocument, compactness is equal to 0 and this measure approaches to 1 depending on the connection density of the hyperdocument. In a fully connected hyperdocument, the value of the measure is equal to 1. For instance, a cycled hyperdocument constructed with four nodes has the compactness value 0.66 if the directions of the links are one-way. On the other hand, 0.88 is obtained as the value of the measure when the hyperdocument has bidirectional links. In the most complicated situation which is illustrated in the third graph of Figure (3), the hyperdocument has the compactness value 1. It is noted that the measures stratum and compactness are not independent measures each other. It can be seen easily that, when the compactness is equal to 1 for a hyperdocument, the stratum value is 0 for the same hyperdocument.

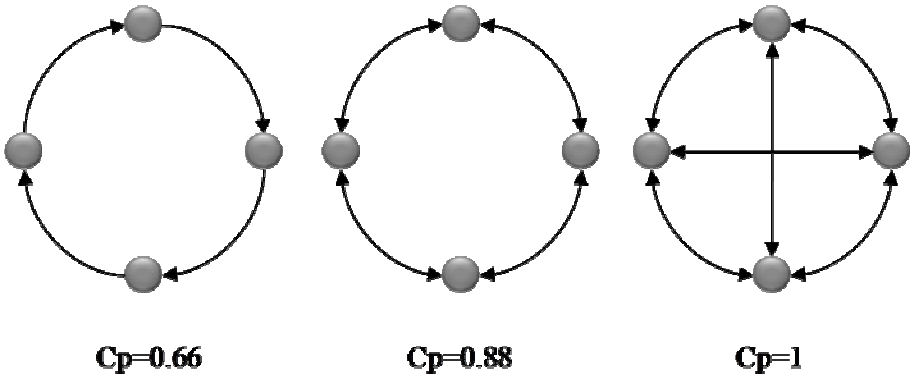

Figure (3). The compactness measure

The revisitation measure is used for calculating the probability that any URL visited is a repeat of a previous visit, using the ratio of the different pages visited to total pages visited, by Catledge and Pitkow (1997). In this study, same formula is used for computing the revisitation scores based on the navigation data of the users.

There is no way to compute easily the stratum and compactness values, or revisitation percentages of the users' navigations in the large graphs such as our hyperdocument which consists of totally connected 68 nodes. Therefore, it is inevitable to use a method to compute the stratum, compactness values and revisitation percentages of the users' navigation graphs using Maple. Applying these procedures to the navigation logs of the users, stratum, compactness and revisitation scores of the users, are obtained, and these scores are formed input data for the statistical analyses.

Procedure

The independent variables in this study were cognitive style (field dependent, field intermediate and field independent), prior knowledge (low and high) and gender. Domain expertise was considered as prior knowledge. The dependent variables were stratum and compactness scores (0 to 1) and revisit percentage. Initially a 25 item multiple choice pretest was given to determine the prior knowledge of students, who were then asked to take the GEFT. Using their GEFT scores, they were categorized into three groups according to their cognitive styles. Firstly, an oral explanation was given to the participants about how to use the CBI tool. During the study, each student worked on a personal computer. The whole treatment was carried out during three weeks for a total of nine hours. Participants were allowed to navigate through CBI in any manner they chose. The nodes which were navigated, and the time period in each node were recorded into a database. At the end of the application, the same 25 item multiple choice test was used as a post test to indicate the students' academic achievement.

Data analyses

Using the template provided by the publisher, the researchers hand scored the GEFT. The scores of the individuals below six were identified as field dependent, the scores in the interval [6-11] were considered as field intermediate, and the students with results more than 11 were identified as field independent. The values of the mean and the standard deviation were 8.97 and 5.08, respectively.

The other data were analyzed by using the Statistical Package for the Social Sciences (SPSS). The research questions were analyzed according to significance level of $p<.05$. Due to the multiplicity of independent variables (high prior knowledge/low prior knowledge, field dependent/field intermediate/field independent, male/female) and dependent variables (stratum scores /compactness scores/ revisit percentage), a 2x3x2 factorial Multivariate Analysis of Variance (MANOVA) was used.

RESULTS

Descriptive Statistics

Table 1 and Table 2 show the descriptive statistics for gender, prior knowledge and cognitive style in the study. Of those 84 participants, 25 students were identified as field dependent, 28 as field intermediate, and 31 as field independent (FI) learners. 72.6% of students (61) were learners with low prior knowledge and 27.4% of students (23) were learners with high prior knowledge. The numbers of the male and female students were 34 and 50, respectively.

Table 1: Student Enrollment by Prior Knowledge and Cognitive Style

FDI	low prior knowledge f %	high prior knowledge f %	Total f (%)
Field Dependent	21 (84)	4 (16)	25 (100)
Field Intermediate	17 (60,7)	11 (39,3)	28 (100)
Field Independent	23 (74,2)	8 (25,8)	31 (100)
Total	61 (72,6)	23 (27,4)	84 (100)

Table 2: Student Enrollment by Gender and Prior Knowledge

FDI	Novice f (%)	Expert f (%)	Total f (%)
Female	34 (68,0)	16 (32,0)	50 (100)
Male	27 (79,4)	7 (20,6)	34 (100)
Total	61 (72,6)	23 (27,4)	84 (100)

Prior Knowledge, Cognitive Style and Gender Effects on Navigation Path

To determine whether there were significant differences in students' stratum scores, compactness scores and revisit percentage based on learners' cognitive styles, levels of prior knowledge and gender, multivariate analysis of variance (MANOVA) was used.

Table 3: The MANOVA Results of Stratum and Compactness Scores According to Prior Knowledge, Cognitive Style and Gender

Dependent variable	Independent variable		N	M	SD	df	F	p
Stratum Scores	Prior Knowledge	High	23	,24	,25	1-82	,041	,840
		Low	61	,25	,23			
	Cognitive Style	FD	25	,26	,26	2-81	1,059	,352
		FM	28	,20	,21			
		FI	31	,28	,23			
	Gender	Male	34	0,21	,19	1-82	,972	,327
		Female	50	0,27	,26			
Compactness Scores	Prior Knowledge	High	23	,61	,24	1-82	2,449	,122
		Low	61	,68	,21			
	Cognitive Style	FD	25	,66	,23	2-81	4,43	,012
		FM	28	,75	,20			
		FI	31	,58	,21			
	Gender	Male	34	,68	,21	1-82	,006	,939
		Female	50	,65	,23			
Revisitation Scores	Prior Knowledge	High	23	50,00	20,30	1-82	4,592	0,035
		Low	61	56,31	15,88			
	Cognitive Style	FD	25	56,56	18,54	2-81	3,437	0,037
		FM	28	58,85	15,23			
		FI	31	49,12	17,15			
	Gender	Male	34	55,65	19,37	1-82	,313	,578
		Female	50	53,86	18,05			

As can seen in table 3, a significant main effect of cognitive styles is observed on users compactness scores (F (2-81) = 4,43 p < 0,05). Field intermediate learners' navigation paths had a higher compactness scores (M=,75) than field independents (M=,58). There are also significant difference in revisitation scores between field intermediate (M=58,85) and field independent (M=49,12) learners. However, no significant main effect of cognitive style were evident on the stratum scores (F (2,81) = .91, p >0.05).

Whereas stratum and compactness scores failed to achieve significance according to prior knowledge, there are significant difference in revisitation scores F (1-82) = 4,59 p < 0,05. There are also no significant main effects of gender on learners' stratum, compactness and revisitation scores.

DISCUSSION

Accord with the results, it was seen that there were no significant main effects of cognitive style on users stratum scores. It was expected that, field dependent students may navigate in a more linear structure because of their tendency of studying in a structured educational setting. There are some findings which show that field dependent students prefer to have a fixed path to navigate usually, and field independent students relatively enjoy non-linear navigation in CBI (Reed and Oughton, 1997; Liu and Reed, 1994). There are also some findings which show that there was no statistically significant interaction between field-dependent/independent cognitive styles and navigation (Ford and Chen, 2000; Andris, 1996). The navigation aids such as hierarchical structure of the index tool (content outline) and breadcrumb lists in our courseware may provide enough structure for field dependent students. Moreover, when a non-linear path is followed, the opportunity of returning to the previous page using the back button on index tool may be useful for field dependent students. This study also found that field intermediate learners' navigation paths had a higher compactness scores (M=,75) than field independents. There are two factors effecting the measurements of compactness. The first one is the number of the different pages visited during navigation. The second one is the direction of the navigation among visited pages. For instance, bidirectional navigation on the compactness value has more effect than one directional navigation between two pages. On the other hand, due to the nature of the compactness measure, navigations between two pages repeating more than two times do not affect the value of the measure. Therefore, to determine the source of the effect which increases the value of compactness measure, a third measure, revisitation is needed. When revisitation scores of users analyzed, the revisit percentage of field intermediate users is higher than the revisit percentage of field independent user. Past researches have not suggested clear evidences about the navigation patterns of field intermediate users. The findings of this study suggest that navigation preferences of field intermediate users can be different from navigation preferences of field dependent and/or field independent.

Increases amount of revisitation is interpreted that a user is more likely to be lost (Alonzo, 2002, Smith, 1997). But it may not be exactly true to claim that field intermediate users can be disoriented based on only revisitation scores. To investigate the relationship between cognitive style and disorientation, research studies which include many different disorientation measures (perceived disorientation, etc.) are needed.

The findings of this study indicate that there was significant difference in revisitation scores between learners with low and high prior knowledge. However there was no significant difference in stratum and compactness scores between learners with low and high prior knowledge. It is not surprising that learners with low prior knowledge had a higher revisitation scores (M=56,31) than learners with high prior knowledge (M=50). It was thought that prior knowledge would change the ways of accessing information of individuals. When the literature was examined, it is seen that there is a general agreement about the idea of "prior knowledge would effect the navigation" (Çalışır and Gürel, 2003). This result may be due to the need for repeating of the content or disorientation of learners related to their low prior knowledge.

Another research aim of this study was to investigate if there were gender-related differences in navigation patterns in CBI. A few studies investigated the differences in navigation strategies of females and males (Schwarz, 2001). For example, Reed and Oughton (1997) conducted a study based on linear and nonlinear navigations of different genders. They concluded that females tend towards more linear structured navigation in the hypermedia. The results of this research showed that there is no significant difference between male and female learners based on their stratum, compactness and revisitation scores.

Future Perspectives

Future research is needed to provide information on impact of individual differences on navigation patterns. Following provides a list of potential future studies.

- A similar study, besides the domain knowledge as prior knowledge level, may be repeated by bearing the computer experience in mind.
- Additional research should examine the effects of individual differences as cognitive style on disorientation by using different measures (asking experienced disorientation to learner or measuring learner performance).
- The differences in navigation patterns of learners while students implement different learning tasks in different contexts can be investigate.
- Studies examining the common effect of individual differences and navigation patterns on task success may be conducted.

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THE ROLE OF PERSONALITY TRAITS IN WEB BASED EDUCATION

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ABSTRACT
This study aims to investigate the relationships among personality traits and learners' academic achievement in a web based environment and attitudes towards web based education. 127 students enrolled in the e-MBA Masters Degree of Bilgi University constituted the study group of the research. A survey method was used for the study and the data were collected by Web Based Education Attitudes Scale and The Adjective Check List (ACL). At the end of the study, it was revealed that the students were successful in the web based education environment with the average of 3.091 out of 4.00. The average of students' attitudes towards web based education was 97.212 out of 135. The arithmetical average of the items in the attitudes scale was 3.738 out of 5.00. Also, significant relationships were found between learners' personality traits, academic achievement and attitudes towards web based education. The findings revealed that personality traits explain about 53.2% of the academic achievement, and 52.7% of the attitudes towards web based education.

Keywords: Web based education, personality traits, academic achievement, and attitudes towards web based education.

INTRODUCTION

Web based learning have provided students different learning alternatives that have expanded the educational process beyond the traditional classroom. Web technologies' penetration of our lives and of both formal and informal education has created a need to examine the various aspects of this new way of learning and to explore how it fits in with different learners' needs (Shany & Nachmias, 2002). Which students can be expected to benefit more from this new learning environment? To what extent is this environment accessible to students with particular styles of thinking, and compatible with their needs? Even though the internet has now been used for over a decade as an education medium for distance delivery, we continue to know relatively little about the characteristics of learners who choose to enroll and succeed in such learning environments. In web based environment, learner interest, expectation and needs differ quite a lot from the traditional educational approaches (Frith & Kee, 2003; Glenn, 2001). That is why adverse effects may result for the future of the system if solutions similar to traditional educational approaches are sought in response to learner issues in this new environment; because achieving the targeted success levels depends on understanding the learners. Literature suggests that individual differences such as cognitive processing styles, learning styles and personality traits are very important in the learning process . In this respect personality traits have been suggested to be one of the important factors that influence students' success in web based education.

Cattell and Kline (1977, p.5) stressed that personality is the natural core of psychological science, since the process area such as perception, memory, learning theory, physiological psychology can only be effectively understood in relation to the unified organism (Mai & Mai, 2002). Personality traits have a positive or negative relationship with motivation and academic achievement, depending on the type of learning activities. Research dating back to the 1960s demonstrates that an individual's personality traits are good predictors of future training and learning performance (Wiggins, Blackburn & Hackman, 1969). Inspired by this research, we believe that personality traits that contribute to student learning should be assessed in order to determine who is most certain to benefit from totally web based courses (Eyong & Schniederjans, 2004). Marks (2000) reported that differences between students rather than differences between classes or schools were responsible for the majority of variability in academic engagement, thus emphasizing the role of students' personality over environmental factors. Therefore, it is important for educators to be informed about the relationship between personality traits and learning performance, but particularly important for web based distance educators.

As Atkinson (2001) argues, in a face-to-face teaching situation the instructor can observe the course participants' learning and adjust the pace, content, and activities according to their progress. The ability to make adjustments arises out of the instructor's ability to read the situation. However, it is more complex in a web based learning environment (Kanuka & Nocente, 2003). Personality traits may help explain some of the variability among students' registering to web based courses. For instance, it may be that web based courses appeal more to the introverted student who walks away from the face-to-face experience and has a more positive attitude to and greater success in web based learning environments (Clark, Uhler & Fisher, 2007). Conscientiousness that is characterized as being purposeful, strong-willed and responsible has the strongest and most stable relationship with academic performance (Busato et al., 2000). Openness to experience, defined as

being open-minded, having an active imagination and preferring variety, was also associated with academic achievement (Blickle, 1996; Lounsbury et al., 2003). Research has shown that introverted (versus extroverted) individuals are more predisposed to web based learning (Moore & Kearsley, 1996). Accordingly, Biner et al. (1995) found that students in web based education programs tended to be more self-sufficient and/or introverted, lax, and expedient than traditional on-campus learners. Being emotionally stable, intelligent, trusting, compulsive, passive, and conforming were also found to be associated with success in web based learning environments (Chamorro-Premuzic & Furnham, 2003; Kanuka & Nocente, 2003; Eyong & Schniederjans, 2004). As such, it is impossible to draw any kind of meaningful conclusion from a comparison of the results of previous research on learning performance.

On the other hand, learners' attitudes towards web based education significantly affect learning outcomes (Sanders & Morrison-Shetlar, 2001; Alomyan & Au, 2004). Learner attitudes are one of the important factors used to measure success of a course, program or curriculum (Phipps & Merisotis, 1999). Therefore, it is necessary for institutions that offer web based education to consider learner expectation and attitudes (Daniels, Tyler, & Christie, 2000). It is also essential to identify affective characteristics such as learner expectation and attitudes in order to obtain positive outcomes from web based learning in education (Erdogan, 2007). For these reasons, a better understanding of the relationship between personality traits and attitudes towards web based education would prove to be beneficial. In the light of the foregoing issues, the purpose of this study was to investigate whether personality traits were related to learners' attitudes towards web based education and academic achievement in a web based environment. The research questions were thus the following:

Research Questions

In this study; the research questions can be stated as follows;

1. What are the personality traits of Turkish students?
2. Are there any significant relationships between learners' personality traits and academic achievement in web based education?
3. Are there any significant relationships between learners' personality traits and attitudes towards web based education?
4. Are there any personality traits that significantly predict the learners' academic achievement in web based education? If so, what are they?
5. Are there any personality traits that significantly predict the learners' attitudes towards web based education? If so, what are they?

METHODOLOGY

Research Model

In the current study, a correlational design was used to investigate the relationships among personality traits, GPA and attitudes towards web based education. Participants were briefed on the purpose of the study and they participated on the principle of willingness. The participants then signed the consent form and completed the survey by themselves. The procedures of the study were explained to the students and any questions arose were answered.

Participants

Learners, enrolled in the e-MBA Masters Degree of Bilgi University in 2005, constituted the study group of the research. 127 learners (out of 570) were chosen randomly to take part in the study.

The e-MBA Program

Bilgi University e-MBA Masters Degree is a web based masters degree in business approved by the Turkish Council of Higher Education and is a web based distance learning system. A total of 786 students are enrolled in the Bilgi University e-MBA Degree, who live in 50 different cities and hold bachelor degrees from 63 different universities (Bilgi Online, 2007). The degree was designed to equip learners with information on subjects such as finance, human resources, marketing and entrepreneurship and to supply strategic demands of the business world. The e-MBA degree offers a Turkish and an English alternative and consists of three sections. Eight required and two optional courses as well as a graduation project should be achieved in order to graduate. The passing grade is 63 out of 100. The final examination, which takes place "under supervision" accounts for 50% of the passing grade. A minimum of 70% success rate is required in the final examination. The length of study in the program is one and a half years and is composed of three half terms. This period can be extended to at most six half terms if one needs to sign up again for the failed courses or in case of a delay in finalizing the graduation project. Course materials prepared by the academic staff are published weekly on the web page of the course on the e-MBA degree website and remain accessible until the end of term. Thus, while the students

study the recently added course notes each week, it is also possible to revise previous notes until the end of the term. Students can also study the course books listed in the program. Quizzes presented at the end of the covered material each week and the interactive questions on the course website allow learners to improve and question their own learning (Bilgi Online, 2007).

Instruments

Data collection took place on the weeks the e-MBA Degree students came to the campus for purposes of final examination or retaking the failed courses. Initially, a Web Based Education Attitudes Scale and The Adjective Check List (ACL) were administered to the e-MBA degree students. Then, the e-MBA Degree average course grades (GPA) were obtained from the department to determine academic achievement of the students. Details pertaining to the data collection instruments are presented below.

Web Based Education Attitudes Scale (WBE-AS)

A 5-point likert scale consisting of 58 questions was developed based on expert opinions and literature review in order to reveal students' attitudes towards web based education (Erdoğan et al., 2007). The 5-point scale was as follows: (5) totally agree, (4) agree, (3) undecided, (2) disagree and (1) totally disagree. 28 items on the scale were cognitive, 18 were affective and 12 were behavioral statements. 35 items were positively and 23 were negatively worded in order to offset the respondents' tendency to "approve" the statements (Tavsancıl & Keser, 2002). The statements were listed randomly. Content validity was ensured at the initial phase of validity and reliability studies of the scale. Item representativeness was evaluated by expert reviews from the areas of Computer and Instructional Technologies, Testing and Evaluation, Psychological Counseling and Guidance and Turkish Language and Literature. 90-100% expert agreement on the validity of each item was adopted as the criteria; items that did not comply with the criteria were removed from the WBE-AS. Construct validity of the scale was ensured by factor analysis and item analysis. As part of the item analysis, item total, item residual and index of discrimination were calculated respectively. At the end of the validity studies, 32 items were eliminated from the scale leaving a 26-item WBE attitudes scale to be administered. Cronbach Alpha internal consistency coefficient of the WBE attitudes scale was .917. Ozdamar (1999) states that a scale is highly reliable if the Cronbach Alpha internal consistency coefficient is between .80 and 1.00 ($.80 \leq \alpha < 1.00$). Accordingly, WBE attitudes scale can be accepted as a reliable measurement tool.

The Adjective Check List (ACL) Inventory

The ACL (Gough & Heilbrun, 1983) is a versatile tool for assessing personality and perceived psychological tendencies of adults and adolescents. The ACL consists of 300 adjectives comprising 37 scales that include measures of psychological needs based on Murray's needs (1983), ego functioning based on Berne's theory (1961), creativity and intelligence based on Welsh's intellection concept (1975), and topical scales created by the authors. The validity and reliability studies were carried out by Savran (1993) who adapted ACL to Turkish. Alpha coefficients of the scale range from .46 to .84 which falls within the range of acceptable reliability coefficients for personality measures (2002). In the current study 15 need scales and 9 topical scales were used to assess Turkish students' personality traits.

Data Analysis

In order to specify the correlations between students' personality traits, GPA and attitudes towards web based education pearson moments correlation coefficient was used. In addition, with the aim of obtaining the most suitable regression equivalent in explaining the students' GPA and attitudes towards web based education multiple regression analysis was used. GPA and attitudes towards web based education are specified as dependent variables whereas personality traits are specified as the independent variables.

RESULTS

For the data analysis, first, the descriptive statistics of 127 students are presented in Table 1.

Table 1. Descriptive statistics for GPA and WBE attitudes

Dependent variables	Mean	St. Dev.
GPA	3.091	0.713
WBE Attitudes Scale	97.212	13.586

As illustrated in Table 1, the average academic achievement of web based education students was 3.091 out of 4.00 with a standard deviation of 0.713. This result indicated that the students were successful in the web based education context. The average of students' attitudes towards web based education was 97.212 out of 135 with a standard deviation of 13.586. The arithmetical average of the items in the attitudes scale was 3.738 out of 5.00.

The average point between 3.00 and 4.00 is considered within the category of "I agree"; therefore, it is possible to conclude that students expressed positive opinions in favor of web based education.

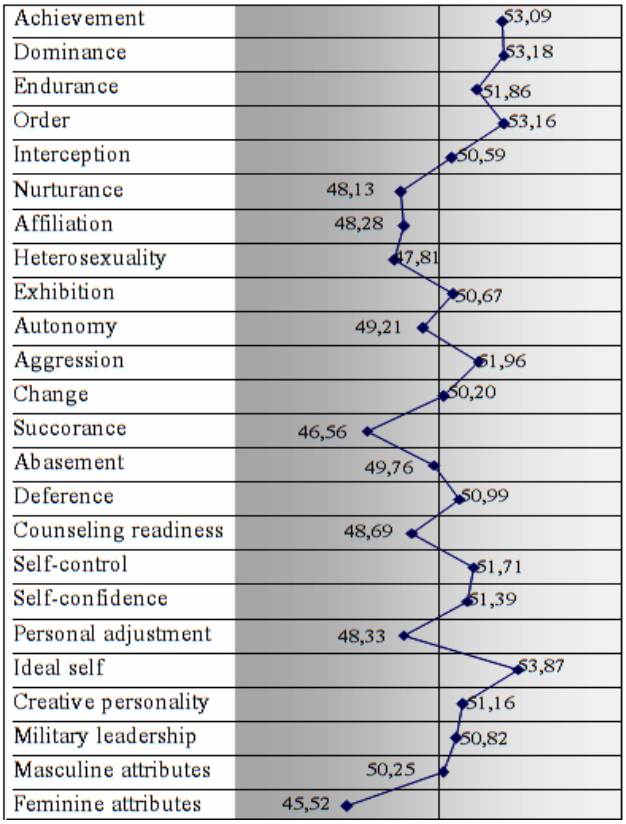

Figure 1. The means of personality traits of the students

For the interpretation of the Adjective Checklist (ACL), first of all the scales above and below 50 points are determined. From the scales above 50, five highest sub-scales are then specified and their basic traits are identified from the highest to the lowest. Then the Q-Sort definitions are used which display a positive correlation with the scale. After determining the first five sub-scales, the lowest three scales are specified and for their interpretation Q-Sort definitions which display a negative correlation with the scale (Savran, 1993). The means of personality traits are presented in Figure 1.

Considering the results, the top 5 sub-scales above 50 are respectively; ideal self (53.87), dominance (53.18), order (53.16), achievement (53.09) and aggression (51.96). The personality traits which have the lowest points are found to be feminine attributes (45.52), succorance (46.56) and heterosexuality (47.81). The common points of the personality traits; ideal self, dominance, achievement, aggression and order can be summarized as follows; "are productive and talkative, are decisive in their behaviors and are impulsive, attaches importance to power, has high ideals, and achieving those ideals are very important for them". The relations among the students' personality traits, academic achievement and attitudes towards web based education are specified in Table 2.

Table 2. The relationships among personality traits, academic achievement and attitudes towards web based education

Personality traits	GPA		Attitude	
	r	p	R	p
Achievement	0.277	0.004	0.232	0.016
Dominance	0.090	0.359	0.166	0.087
Endurance	0.212	0.212	0.187	0.053
Order	0.093	0.342	0.100	0.304
Interception	-0.036	0.713	0.095	0.332
Nurturance	-0.094	0.336	0.193	0.046
Affiliation	-0.069	0.479	0.098	0.314
Heterosexuality	0.018	0.855	-0.019	0.844
Exhibition	0.092	0.347	-0.039	0.686
Autonomy	-0.004	0.970	-0.149	0.124
Aggression	0.033	0.733	0.018	0.850
Change	-0.194	0.045	0.016	0.871
Succorance	-0.063	0.517	-0.210	0.029
Abasement	-0.099	0.311	-0.109	0.264
Deference	-0.156	0.109	-0.023	0.811
Counseling readiness	0.223	0.021	0.012	0.901
Self-control	-0.067	0.496	-0.034	0.725
Self confidence	0.087	0.375	0.153	0.114
Personal adjustment	-0.006	0.951	0.065	0.506
Ideal self	0.255	0.008	0.243	0.011
Creative personality	0.057	0.559	-0.026	0.788
Military leadership	0.040	0.683	0.241	0.012
Masculine attributes	-0.043	0.663	0.063	0.520
Feminine attributes	-0.136	0.164	-0.097	0.321

Table 2 reveals the positive correlations were found among the students' personality traits and GPA such as achievement ($r=0.277$, $p<0.05$), counseling readiness ($r=0.223$, $p<0.05$) and ideal self ($r=0.255$, $p<0.05$). However, negative correlation was also detected between change and GPA ($r= -.194$, $p<0.01$). On the other hand, significant positive correlations were found between personality traits and attitudes towards web based education such as achievement ($r=0.232$, $p<0.05$), nurturance ($r=0.193$, $p<0.05$), ideal self ($r=0.243$, $p<0.05$) and military leadership ($r=0.241$, $p<0.05$). However, attitudes towards web based education was negatively correlated with personality traits such as succorance ($r=-0.210$, $p<0.01$). Table 3 shows the results of the multiple regression analysis regarding the prediction of the students' GPA scores in web based education.

Table 3. The results of the multiple regression analysis regarding the prediction of the students' GPA scores in web based education

	B	St. Er.	βeta	t	p
Constant	-0.283	2.225	-	-0.127	0.899
Achievement	0.005	0.009	0.068	0.480	0.632
Dominance	-0.008	0.013	-0.120	-0.645	0.521
Endurance	0.020	0.011	0.308	1.861	0.067
Order	-0.018	0.011	-0.272	-1.610	0.111
Interception	0.011	0.008	0.157	1.337	0.185
Nurturance	-0.029	0.012	-0.420	-2.481	0.015
Affiliation	-0.012	0.010	-0.178	-1.267	0.209
Heterosexuality	0.009	0.008	0.140	1.122	0.265
Exhibition	0.045	0.014	0.535	3.165	0.002
Autonomy	0.005	0.012	0.058	0.420	0.675
Aggression	-0.019	0.013	-0.237	-1.491	0.140
Change	-0.020	0.008	-0.294	-2.509	0.014
Succorance	-0.014	0.009	-0.196	-1.583	0.118
Abasement	0.009	0.013	0.120	0.667	0.506
Deference	0.008	0.014	0.101	0.612	0.542
Counseling readiness	0.015	0.005	0.323	3.255	0.002
Self-control	0.005	0.012	0.048	0.399	0.691

Self confidence	0.008	0.014	0.111	0.562	0.576
Personal adjustment	0.007	0.009	0.100	0.786	0.435
Ideal self	0.016	0.006	0.256	2.477	0.015
Creative personality	0.000	0.009	-0.005	-0.045	0.964
Military leadership	-0.004	0.010	-0.054	-0.422	0.674
Masculine attributes	-0.017	0.008	-0.258	-2.094	0.040
Feminine attributes	0.007	0.007	0.119	1.014	0.314

In order to identify the predictors of students' GPA scores multiple regression analysis was used. As a result, positive relations were detected between the students' GPA scores and personality traits ($F=3.161$; $p<0.01$). There are 24 different personality traits, and these traits explain about 53.2% of the total variance of the GPA scores. The variables that significantly predict the students' GPA scores are counseling readiness ($t=3.255$; $p<.05$), exhibition ($t=3.165$; $p<.05$), ideal self ($t=2.477$; $p<.05$), nurturance ($t=-2.481$; $p<.05$), change ($t=-2.509$; $p<.05$), and masculine attributes ($t=-2.094$; $p<.05$). Table 4 shows the results of the multiple regression analysis regarding the prediction of the students' attitudes towards web based education.

Table 4. The results of multiple the regression analysis regarding the prediction of the students' attitudes towards web based education

	B	St.Er.	βeta	t	p
Constant	103,665	40,468	-	2.562	0.012
Achievement	0.132	0.179	0.104	0.738	0.463
Dominance	0.116	0.246	0.088	0.473	0.638
Endurance	-0.257	0.205	-0.205	-1.253	0.214
Order	-0.032	0.207	-0.026	-0.156	0.876
Interception	-0.140	0.152	-0.107	-0.922	0.359
Nurturance	0.364	0.216	0.280	1.684	0.096
Affiliation	-0.058	0.183	-0.044	-0.316	0.753
Heterosexuality	-0.222	0.150	-0.181	-1.480	0.143
Exhibition	-0.173	0.266	-0.110	-0.651	0.517
Autonomy	-0.187	0.222	-0.115	-0.840	0.403
Aggression	-0.212	0.240	-0.140	-0.885	0.379
Change	-0.044	0.151	-0.034	-0.290	0.772
Succorance	-0.131	0.172	-0.094	-0.764	0.447
Abasement	0.082	0.253	0.058	0.324	0.747
Deference	-0.288	0.257	-0.184	-1.124	0.264
Counseling readiness	-0.036	0.088	-0.040	-0.409	0.684
Self-control	-0.226	0.231	-0.116	-0.978	0.331
Self confidence	0.335	0.269	0.244	1.245	0.217
Personal adjustment	0.009	0.166	0.007	0.054	0.957
Ideal self	0.060	0.120	0.051	0.498	0.620
Creative personality	-0.296	0.162	-0.210	-1.822	0.072
Military leadership	0.156	0.187	0.107	0.835	0.406
Masculine attributes	-0.021	0.158	-0.017	-0.134	0.894
Feminine attributes	-0.163	0.134	-0.141	-1.213	0.229

Regression analysis results presented below in Table 4. The score of the attitudes towards web based education was run as the dependent variable in the regression analysis where personality traits were independent variables. This analysis yielded a significant result ($F=3.263$; $p<0.01$). Independent variables explain about 52.7% of the total variance of web based education attitudes. However, there is any personality traits that significantly predict the students' attitudes towards web based education.

DISCUSSIONS

GPA scores and attitudes towards WBE

The average academic achievement of web based education students was 3.091 out of 4.00 with a standard deviation of 0.713. This result indicated that the students were successful in the web based education context. In web based education, achievement levels similar to traditional education can be attained if sufficient support is provided. The results of several national and international studies denote the same idea. Leonard and Smita (2001) reported that students in web based education had an achievement level of 4.14 out of 5.00, while Johnson stated a level of 3.00 out of 4.00 (Johnson, 2001). Obtaining achievement levels, in web based education, akin to traditional educational settings results in an increase in the demand for web based education. In developed countries such as the USA and EU countries investment into web based education gradually increases each year.

The average of students' attitudes towards web based education was 97.212 out of 135 with a standard deviation of 13.586. The arithmetical average of the items in the attitudes scale was 3.738 out of 5.00. The average point between 3.00 and 4.00 is considered within the category of "I agree"; therefore, it is possible to conclude that students expressed positive opinions in favor of web based education. This is even more prominent when student answers to some of the web based education attitudes scale items are reviewed. For example the arithmetical average points for the following scale items were: "WBE is an alternative solution to educational issues": 4.23/5.00; "The prevalence of WBE would benefit the society": 4.14/5.00; "WBE is as efficient as traditional education": 3.69/5.00. It will not be feasible to test the success of web based education only by means of students' cognitive achievement. Affective learning is as equally important as cognitive learning in the context of education, because a student, who has attained sufficient academic success, cannot be considered to have achieved educational goals completely if s/he is not satisfied with the training. The findings of the current study indicate that the students were satisfied with the training they received and trust such an educational setting. A review of relevant literature reveals several similar research findings. Kanuka and Nocente (2003) asserted that 97% of the students that took part in their study were satisfied with the web based training they received. Leonard and Smita (2001) investigated student perspectives in online education. They contended that 90% of the students who were in web based education expressed that they received the training they required in the online environment and 75% that the education met their expectations and would like to register for another online training. In a study by Chin and Chang (2002), 97% of the participants who received online education, from 14 different countries, stated their belief that web based education was beneficial. In a study on the importance of individual differences in web based education by Mira (2004), the participants generally voiced positive opinions of web based education. These results provide support for the findings of the current study.

Correlations between GPA scores and personality traits

In this study, positive correlations were found among the learners' GPA scores and personality traits such as achievement, counseling readiness and ideal self. Personality traits predict the students' GPA scores and explain about 52.3% of the total variance. The total variance shows that personality traits have a sufficient ratio of effect on GPA scores.

The Q-Sort definitions that display a positive correlation with the achievement personality trait are as follows: "Is selective in work and personal life? Is talkative and productive? Is quick to handle own business? His/her behaviors are decisive and impulsive. Has high ideals and attaining those ideals are very important for the individual? Is willing to attend to a certain work and to direct his/her attention to it? Is realistic, dreams and unrealistic thoughts do not have a place in his/her life? Is proud of being objective and rational?"

The Q-sort definitions in positive correlation with the counseling readiness sub-scale are: "Is critical and skeptic? Is not easily influenced values intellectual and conceptual matters? Values own independence and autonomy. Is friendly? Can establish close relations, is compassionate? Is giving to others, is easily influenced? Does not object to others' pressure and dominance on him/herself?"

The Q-sort definitions in positive correlation with the ideal self sub-scale are: "Has a wide range of interests? Is productive? Is quick to handle issues? Has high ideals and attaining those ideals are very important for the individual? Has a certain and active role in society, is at ease among others? As the individual has high self-

confidence, has a tendency to advice others in similar ways? It is difficult to change the ideas of this person who has a unique life philosophy."

The definitions above make it clear those individuals who have achievement; counseling readiness and ideal self personality traits are selective in their work and personal lives and work carefully. Their behaviors are decisive and impulsive. They have high ideals. Achieving their targets is very important for these individuals. In such a context, it is not surprising that those individuals, with the above mentioned personality traits whose grade points are high; also attain academic success in web based education environments. As this finding indicates, personality traits that have an impact on success in classical education systems also remain valid for web based environments. The results of several studies conducted at classical education settings have confirmed positive correlations between students' personality traits of achievement and ideal self and their academic success (Ergün, 2003; Begik, 1997). Likewise, Begik (1997) found negative correlations between students' personality trait of change and their academic success. The findings of the present study are in accordance with these previous findings. Therefore, it can be argued that students who are successful within the classical education system are also successful in web based education.

On the other hand, several other studies have also investigated the relationship between students' academic success and their personality traits (Valentia et al., 2001; Biner, et al. 1995, Wang and Newline, 2000). In their study where Eyong and Schniederjans (2004) investigated such a relationship identified statistically significant relations between academic success and five types of personality traits (contentedness, extroversion, attentiveness, stability and openness). Similarly, Shany and Nachmias (2001) observed that personality traits had an effect on success and attitude. For example; students with a liberal style were found to be more successful and contended in online environments than other students and introverted students to be more successful than extroverts. In contrast, the research by Shih and Gamon (1999) indicated that there was not any meaningful correlation between students' personality traits and their success.

Correlations between WBE attitudes and personality traits

The results displayed a positive correlation between web based education attitudes of the students in the study group and their personality traits of achievement, tenderness, ideal self and military leadership; and a negative correlation with the personality trait of succorance. 52.7% of the variance in attitudes towards web based education is explained by students' personality traits. It is an anticipated result in that the students who score high on the sub-scales of achievement, nurturance and ideal self would also have a positive attitude towards web based education with respect to productivity and communication. Internet offers a great opportunity to access information, to communicate and to keep up-to-date with innovations. That is why these students consider web based environment as an effective tool in achieving their ideals which are of high importance to them.

Many of us have certain dominant tendencies in the way we process information and in comprehension procedures. These choices, in integration with personality traits, create the learning motive. For instance, introverted students tend to hesitate before they take action, extroverts act without any hesitations at all. In a web based environment, the introverted student has a chance to think before responding to discussion threads and thus is able to react more at ease. In contrast, introverted students usually prefer to keep silent and passive in face-to-face education as they cannot express their immediate thoughts (Ellis, 2003). On the other hand, the extroverted students, who are much more active and dominant in classical education, tend to give up on the course as they grow impatient in front of the computer. Therefore, participation levels decrease in such education programs (Livingood, 1995).

Many studies to date have revealed meaningful relations between students' personality traits and their attitudes towards web based education (Shany and Nachmias, 2001). For example, the research by Russel investigated the relationship between students' personality traits and their web based education attitudes in which personality types of the participants were determined using "Myers Briggs Type Indicator (MBTI)" (Russell, 2002). The findings of the study laid out differences in expectations from and attitudes towards web based education among students who had different personality types. In a similar vein, Ellis also explored relations between students' personality types and their attitudes towards web based education and specified positive relations between personality types and attitudes (Ellis, 2003). On the contrary, such a relationship was not observed in other studies (Kanuka and Nocente, 2003; Stokes, 2001).

FUTURE DIRECTIONS

As exemplified by the above findings, a thorough analysis of personalities, abilities, interests and attitudes of students in web based education is crucial for web based education systems to be effective and permanent (Anderson, 2003; Stokes, 2001). It may not be favorable to suggest such educational settings to students without

knowing the ways to success, because web based education is not suitable for all student types (Muse, 2003). Therefore, assessment tools are needed that could be used to determine the students who have a risk of being unsuccessful in web based education. Individual characteristics that could affect learning outcomes should certainly be considered in choosing students to web based education (Eyong and Schniederjans, 2003). Educational managers, pedagogues, psychological-counseling consultants, communication experts and instructional technologists should work in cooperation in order to attain success in web based education.

As is clear from the research findings, students' personality traits are prominent in predicting the success in web based education. Therefore, it is argued that the use of relevant tests in student selection decisions by institutions that offer web based graduate courses would promote quality in education. Personality traits that effect students' achievement and attitudes were discussed by the current study. Prospective studies could investigate other individual characteristics such as intelligence, ability, learning styles or cultural variables. The present study was limited to the sub-scales of the Adjective List. Future research could complement the results by employing the other sub-scales of ACL: Ego states and control. The present study was also limited to the students in web based education. Future research could probe the perspectives and approaches of the lecturers, managerial or technical staffs who work in web based education settings.

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