PREFERENCES ON INTERNET BASED LEARNING ENVIRONMENTS IN STUDENT-CENTERED EDUCATION

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ABSTRACT

Nowadays, educational systems are being questionned to find effective solutions to problems that are being encountered, and discussions are centered on the ways of restructuring systems so as to overcome difficulties. As the consequences of the traditional teaching approach, we can indicate that the taught material is not long-lasting but easily forgotten, that students do not sufficiently acquire the knowledge and skills that are aimed at developing, and that students lack transferring their knowledge to real life. In our current situation, individuals prefer to use educational resources where and when they want, based on their individual skills and abilities. Throughout the world, because the internet infrastructure has developed quite rapidly, it has been offered as an alternative way for a rich learning and teaching environment.

This study aims at determining teacher candidates' preferences regarding internet-based learning environments in student-centered education by involving the teacher candidates enrolled at Osmangazi University, Faculty of Education, Primary School Teaching, Mathematics Teaching and Computer and Educational Technologies Education programmes. This study is a descriptive study. The data collection scale consists of the "Constructivist Internet-based Education of Science Scale (CILES-S)". The sample group of teacher candidates in the study showed differences with respect to their preferences regarding internet-based learning in student-centered education. The candidates scored higher in the internet-based learning environments of Cognitive Development and Critical Judgement. The lowest average scores of the sample group were observed in the internet-based learning environment of Episthemologic awareness.

Keywords: **Internet-based learning; internet-based learning environments; student-centered learning; student-centered learning environments.**

INTRODUCTION

Nowadays, educational systems are being questionned to find effective solutions to problems that are being encountered, and discussions are centered around the ways of restructuring systems so as to overcome difficulties. Especially at schools, problems can be claimed to be the result of traditional educational applications. When the main characteristics of traditional teaching methodologies is examined, the following features come out: mainly based on information transfer, too dependent on coursebooks, a teacher-centered approach, students are cognitively passive, no room for creative thinking, no consideration of individual differences, and an atmosphere that deters students from expressing their personal opinions.

As the consequences of the traditional teaching approach, we can indicate that the taught material is not long-lasting but easily forgotten, that students do not sufficiently acquire the knowledge and skills that are aimed at developing, and that students lack transferring their knowledge to real life.These problems that result from traditional teaching approaches has led scolars in the area of educational sciences to launch studies aimed at developing teaching methodologies. Teaching methodologies, if based on a theory of learning, become more effective. A learning theory can be defined as a model or system consisting of generalizations and principles that explain how humans learn based on the results of the research done in this area. In terms of their general pecularities, teaching and learning theories can be classified as objectivist and constructivist.

Traditional methodologies are based on objectivist approach. Constructivist approach is claimed to be an alternative way that offers many solutions to problems encountered in the traditional methodologies (Deryakulu, 2000). The constructivist approach is based on the belief that knowledge does not exist independently from the individual in the outside world and that knowledge cannot be integrated into human brain passively, rather it is constucted in the human brain by the individual him/herself (Cunningham, 1991; Duffy & Jonassen, 1991. cited in Deryakulu, 2000).

According to the constructivist approach, learning is the process whereby the individual structures or at least interpretes prior knowledge with the objects, events and concepts that he/she receives (Jonassen, 1994. cited in Deryakulu, 2000). The educational settings where the constructivist approach is applied, the learners are expected to take more responsibility and be more active because the cognitive process to learning requires the learner's own efforts. Thus, constructivist learning atmospheres need to be set up in such a way that learners are in closer contact with their environment and, as a result, go through rich learning experiences. With the help of such learning atmospheres, the learners get the chance to test their prior knowledge, to correct inaccurate knowledge or replace old knowledge with new one (Yaşar, 1998). Within this framework, student-centered education attracted the attention to individual differences, individual needs and flexible educational environment.

Learning Environment

In student-centered learning framework, organizing educational programmes supporting students' learning, leaving space for students' choices, providing cooperation, providing evaluation triggering ongoing active education, researching student interests, offering chances for students to explain their views and thoughts are highlighted (http://www.vathena.arc.nasa.gov).Student-centered educational environments are set up in such a way that they give students the chance to take the responsibility for organizing, analyzing and synthesizing knowledge, and consequently play a more active role in their own learning (Means, 1994). These environments provide students with the opportunities of explaining complex problems and solve those in cooperation, and by applying to different sources (Hannafin and Land, 1997).

This approach gives students the chance to take individual responsibility and adapt an active role in the teaching-learning process at the highest level. The mechanisms of self-confidence and self-control in individuals improve at a better rate.Student-centered learning is an important strategy among the innovations in education.

It is a learning strategy which makes students work both individually or as a group, makes students put effort in gaining knowledge rather than learning passively, and which allows students to express problems. This strategy gives students more rights and control over subject choice, learning methods and study skills (Gibbs, 1992). Oblinger and Maruyama (1996), say that in student-centered learning environments, the concepts of teacher/student roles, place and time change. Place cannot be limited to the classroom. "Psudo-environments" can be created for learning to take place. Time is at the same time a variable. The length of learning activities can change depending on the students' programme and educational aims. In addition, technology exhibits different features within the student-centered learning context. According to Katz (1999), the advantages of student-centered learning are; giving students responsibility independently, giving students the responsibility of lifelong learning skills, motivating students, teaching students the skills of self-evaluation, time management and information gathering.

De La Herpe, Kulski and Radloff (1999), determined the effective learners' characteristics in student-centered learning in the following way: they have specific learning objectives, have wide range of learning strategies and know when to use those, use accessible resources in the most effective way, take responsibility for their own learning, have the skills of adapting to learning processes, planning, observing and evaluating, express their feeling in an appropriate way, understand the learning process, and are aware of their strengths and weaknesses. In our current situation, individuals prefer to use educational resources where and when they want, based on their individual skills and abilities. Throughout the world, because the internet infrastructure has developed quite rapidly, it has been offered as an alternative way for a rich learning and teaching environment.

Internet Based Learning

Internet-based learning is the reflection of the educational applications onto the teaching-learning process by using the internet. Internet-based learning provides both the learner and the teacher with many advantages (Owston, 1997; Horton, 2000):

- **The material designed for internet-based learning is constantly updated.**
- **Irrespective of place and time, learners have access to the teacher, to educational resources and other learners.**
- **It offers a more flexible educational setting that accounts for learners with different learning styles.**
- **It reduces the cost of accessing sources.**
- **It increases social interaction and cooperation.**
- **It reinforces the in-class learning.**
- **It makes learners more effective.**
- **It offers a chance to reach real data.**
- **It offers an in-depth learning experience.**
- **By increasing learners' thinking skills, it gives them the chance to think and make decisions.**
- **It makes learners differentiate among information resources.**

The reasons why the internet is so widespread nowadays are as follows: (Isman, 2005).

User-Friendiness
People use internet with ease. It does not require a unique skill.

Easy To Move From Some Place To Another
Within a minute, remote places in the world can be visited.

Multimedia Applications Can Be Used At The Same Time
On the internet, applications such as sound, video and animation can function at the same time.

The Existence of Supplementary Tools
Some tools on the internet, such as browsers, ease use.

Ease of Printing Information
It is easy to print out an article or book. Thousands of people can read it at the same time.

Number of Users İncreases
Millions of people use it and it increases day by day.

If internet-assisted learning is applied in an effective way, it is believed that it would affect the teaching-learning process in a positive way. When designing internet-based learning processes, it is important that the teaching-learning processes combine learning theories and teaching methodologies. Internet-based teaching-learning applications provide students with several contributions. These can be listed as follows:

It Makes Learning Active
Students always have to be active to learn information. This helps students retain information for a long time.

Opportunity For İndividual Learning
Student learn in different ways. With the internet, they get the chance of doing individual work. They try to reach information on their own.

Chance For Cooperative Learning
With internet, students can work together with their friends to learn. Thus, they can increase their amount of learning.

For Learning, Special Competencies Are Needed
In order to learn from the internet, students need to acquire certain competencies (e.g. using the computer, researching skills). Gradually, these competencies help students to learn.

Learning With Practice
While learning via the internet, students realize certain applications (Ryder ve Hughes 1997. Citred in. İşman, 2005).
In addition to these, the following contributions can be listed:

Motivation
Students are motivated to learn information from the internet. As a result, permanent learning takes place.

Access To Updated ınformation
Both teachers and learners can easily reach the most recent information on any topic. Thus, modern educational activities take place.

Limitless Learning
Limitless teaching-learning activities are possible with the internet. By the use of the internet, no boundaries can be set against learning.

Project-Based Learning
Teachers get the chance to assign project-based assignments. Consequently, an increase in learning can be observed.

Worldwide Learning Gets Smaller
Today, reaching information is done with ease. That's why, global educational activites can be more widely prepared. Consequently, any educational activity from any part of the world can be taken.

Learning The Skill Of Learning
Both teachers and learners can learn the skill of learning via the internet easily. As a result, permanent change in behaviour takes place (Isman, 2005).

Internet-based aids keep changing the structure of the educational system. Within this process of change, the structure of the educational system moves towards the cyber environment. For educational activities, web-sites will be designed and the basic principles of education will change. Internet-based educational systems will have the following features:

Multi-Dimensional Learning Environments
Both teachers and students will be able to perform multi-dimensional teaching-learning activities by the use of the internet. In other words, students will develop multi-dimensionally.

As a result, students will function in the society as individuals who possess the abilities of critical thinking, discovering, inventing and creating.

Student-Centered Approach
All teaching-learning activities will be realized by the students so they will become active.

Multi-Dimensional İnformation Flow
Students will reach information not only from one source but different sources. As a result, they will have the chance of reaching the information they need with ease.

Cooperation
Cooperation between teachers and students will be established. Thus, students will get the opportunity to socialize and develop their ability of creativity.

Teacher-Guided Activities
Teachers will act as guides in the teaching-learning process and guide students according to their needs.

Creative Thinking

By the use of internet, students' critical thinking skills will develop as they will reach quite different information. Besides, as students will have accomplished the tasks themselves, their thinking skills will have improved.

Education Based On Abilities and Needs

By the use of the internet, students will easily get engaged in educational activites that correspond to their interests and abilities. Consequently, an increase is expected in their success rates.

Communication with Real World

Students and teachers will be able get into interaction with the real world. They will have the chance to learn about the events in the world from different sources. Technological environments in the objectivist approach (traditional methodologies) have foregrounded the role of information transfer, that is, more teaching.

However, in the constructivist approach, the role of technology is to support and ease learning. Technology is a tool to achieve constructivist teaching applications. Technologies that are used as tools yield meaningful thinking. Learners use technology as a tool to analyze the world, to access information, to interpret and organize their own knowledge, and to share it with others. These tools are designed to ease and trigger cognitive processes. At the same time, internet technologies serve as assets for teachers to fulfil constructivist acitivites.

The Purpose of the Study

This study aims at determining teacher candidates' preferences regarding internet-based learning environments in student-centered education by involving the teacher candidates enrolled at Osmangazi University, Faculty of Education, Primary School Teaching, Mathematics Teaching and Computer and Educational Technologies Education programmes.

The following research questions were asked within the general framework of the study.

- **What is the distribution of the teacher candidates' preferences regarding internet-based learning environments in student-centered education?**
- **Does the distribution of the teacher candidates' preferences regarding internet-based learning environments in student-centered education show any difference with regards to the programme they are enrolled at?**
- **Does the distribution of the teacher candidates' preferences regrarding internet-based learning environments in student-centered education show any difference with regards to their gender?**
- **Does the distribution of the teacher candidates' preferences regrarding internet-based learning environments in student-centered education show any difference with regards to the year (class) they are enrolled at?**

METHODOLOGY

This section outlines the research design, the sample group, the preparation and administration of the data collection instrument, and the analysis of the data arrived at, at the end of the data collection procedure.

Research Design

This study is a descriptive study that aims at indentifying teacher candidates' preferences regarding internet-based learning in student-centered education by involving 190 teacher candidates enrolled at Osmangazi University, Faculty of Education, Primary School Teaching, Mathematics Teaching and Computer and Educational Technologies Education (BOTEB).

Sample Group

Information about the sample group is shown in Table: 1.

Table: 1
Personal Information about the Sample Group

Variables	N	%
Gender		
Female	129	67.9
Male	61	32.1
Total	190	100.0
Programme		
Computer and Educational Technologies	14	7.4
Mathematics Teaching	86	45.3
Primary School Teaching	90	47.4
Total	190	100.0
Class		
1	20	10.5
2	112	58.9
3	29	15.3
4	29	15.3
Total	190	100.0

Data Collection Instrument

The data collection scale designed for data collection consists of two parts. First part consists of questions eliciting the teacher candidates' personal information; the second part consists of the "Constructivist Internet-based Education of Science Scale (CILES-S)" which aims at identifying teacher candidates' preferences of internet-based learning. The data collection instrument of the study "Constructivist Internet-based Education of Science Scale (CILES-S)" was developed by Chin-Chun Tsai (2005). The scale consists of 39 items and covers eight sub-dimensions. For the statements in the Constructivist Internet-based Education of Science Scale (CILES-S) the labellings of "Strongly Agree (5)", "Agree (4)", "Neutral (3)", "Disagree (2)", and "Strongly Disagree (1)". A detailed description for each CILES-S scale, with a sample questionnaire item, is presented below.

Ease Of Use Scale

Measuring perceptions of the extent to which students prefer that the Internet-based science learning environments are easy-to-use. When navigating in the Internet-based science learning environments, I prefer that they are easy to navigate.

Relevance Scale

Assessing perceptions of the extent to which students prefer that the Internet-based science learning environments are authentic and represent real life situations. When navigating in the Internet-based science learning environments, I prefer that they show how complex real-life environments are.

Multiple Sources

Exploring perceptions of the extent to which students prefer that the Internet-based science learning environments contain various information sources and interpretations. When navigating in the Internet-based science learning environments, I prefer that they can connect to rich relevant web resources.

Student Negotiation Scale

Assessing perceptions of the extent to which students prefer to have opportunities to explain and modify their ideas to other students in the Internet-based science learning environments. In the Internet-based science learning environments, I prefer that I can discuss with other students how to conduct investigations.

Cognitive Apprenticeship Scale

Exploring perceptions of the extent to which students prefer to have opportunities to acquire helpful and timely guidance provided by the Internet-based science learning environments. When navigating in the Internet-based science learning environments, I prefer that they can provide experts' guidance to facilitate advanced learning..

Reflective Thinking Scale

Measuring perceptions of the extent to which students prefer to have the opportunities to promote critical self-reflective thinking in the Internet-based science learning environments. In the Internet-based science learning environments, I prefer that I can think deeply about how I learn.

Critical Judgment Scale

Assessing perceptions of the extent to which students prefer to have opportunities to critically evaluate information in the Internet-based science learning environments. In the Internet-based science learning environments, I prefer that I can evaluate the features of various information sources.

Epistemological Awareness Scale

Assessing perceptions of the extent to which students prefer to have opportunities to explore the value, source, merit or nature of knowledge in the Internet-based science learning environments. When navigating in the Internet-based learning environments, I prefer that they can explore deeply about the nature of knowledge.

The reliabiliy and validity studies of the data collection instrument were carried out. To test the reliability of the Constructivist Internet-based Education of Science Scale (CILES-S), Cronbach Alpha Coefficients were calculated. As a whole the Constructivist Internet-based Education of Science Scale (CILES-S) has a high degree of reliability (Alpha: ,907). Table 2 shows the results of these calculations.

Table: 2
Constructivist Internet-based Education of Science Scale (CILES-S)
Cronbach Alpha Coefficients

CILES-	Alpha
Ease of use scale (1.2.3.4.5)	,763
Relevance scale (6.7.8.9.10)	,734
Multiple sources (11, 12,13,14,15)	,739
Student negotiation scale (16,17,18,19,20)	,810
Cognitive apprenticeship scale (21.22.23.24.25)	,733
Reflective thinking scale (26.27.28.29.30)	,690
Critical judgment scale (31.32.33.34)	,661
Epistemological awareness scale (35.36.37.38.39)	,644
Total (39)	

Table: 2 also demonstrate that the Constructivist Internet-based Education of Science Scale (CILES-S) demonstrates a high degree of reliability as a whole. In the evaluations of the Alpha coefficient, the following criteria were followed;

If the value is $0.00 \leq \alpha < 0.40$, the scale is not reliable, if it is $0.40 \leq \alpha < 0.60$ the scale has low reliability, if the value is $0.60 \leq \alpha < 0.80$ the scale is quite reliable, if it is $0.80 \leq \alpha < 1.00$ the sclae is highly reliable.

For group comparisons, the reliability of the scale can be between .60-.80. The reliability value of the a scale designed to make decisions about individuals shuold be above 0.80 (Özçelik, 1989).

Analysis of the Data

The interpretation of the data which is analyzed based on the computerized SPSS 9.0 programs, consists of arithmethical averages and one-way variance analysis. Statistical analyses have been done by taking total scores into consideration. The level of significance was taken as .05. In the analysis of the data, the techniques of t-test, variance anaysis and Tukey HSD test to determine which dimensions caused the observed difference between averages were used. It is suggested that in cases where two-way comparisons of groups of more than 8 are concerned, Tukey HSD Testi be applied (Ozdamar, 2002).

FINDINGS AND INTERPRETATIONS

This section contains the analysis of the data gathered with the data collection instrument and their interpretations. The findings are grouped under four headings in line with the research questions.

Teacher Candidates' Preferences Regarding Internet-Based Learning in Student-Centered Education

The first research question was related to the distribution of teacher candidates' preferences regarding internet-based learning in student-centered education. First of all, in order to get an overall understanding of the sample teacher candidates' preferences regarding internet-based learning, arithmethical average and standard deviation about the educational environments was calculated. The findings are demonstrated in Table: 3.

Table: 3
Arithmethical Averages and Standard Deviation Results on Constructivist Internet-based Learning Environments

Constructivist Internet-based learning environments	N	Mean	Std. Deviation	Variance
Ease of use scale	190	4,2853	,51321	,263
Relevance scale	190	4,0989	,60535	,366
Multiple sources	190	4,1316	,59179	,350
Student negotiation scale	190	4,2032	,63161	,399
Cognitive apprenticeship scale	190	4,2674	,53382	,285
Reflective thinking scale	190	4,2463	,51307	,263
Critical judgment scale	190	4,3095	,51044	,261
Epistemological awareness scale	190	3,9874	,62796	,394
Total	190	4,1881	,38901	,151

When the findings are examined, it can be seen that the sample group shows differences about their preferences regarding internet-based learning environments. When the average values in Table 3 are examined, we can see that candidates' scores on critical judgement and cognitive advancement are higher than internet-based learning environments.

Thus, it can be claimed that candidates favour activities that fall under these two learning environments. It is possible to say that the candidates prefer the acitivities of information evaluating and critisizing offered by the internet-based learning environment, furthermore, they favour the guidance of an expert so as to reach useful information.

Table: 3 refers to the fact that the candidates least favoured internet-based learning environment, based on the low average, is what is called epistemological awareness. The conception behind this environment type is that the internet offers information about the roots of the given information, the origin, formation and development of the information reached.

However, the sample group in this study indicated that they favoured the other environments more, rather than the fact that the information is given in this way.

Lee, Min-Hsien and Tsai, Chin-Chung (2005), in their study, explores high school students' and teachers' preferences toward the constructivist Internet-based learning environments in Taiwan.

The study proposes a framework, including two dimensions and five aspects, to illustrate the features of the Internet-based learning environments. Based upon this framework, the "Constructivist Internet-based learning environment survey improvement" (CILESI) was developed, which includes the scales of ease of use, multiple sources, student negotiation, reflective thinking, critical judgement and epistemological awareness.

Questionnaire responses gathered from 630 high school students in Taiwan suggested that the CILESI showed adequate reliability in assessing students' preferences. Students, when compared with their teachers, seemed to express more preferences towards the features of student negotiation, reflective thinking, critical judgement and epistemological awareness of Internet-based learning environments.

Tsai, Chin-Chung (2004), in his study explores the use of the ınternet as an epistemological tool for ınstruction. This study argues that Internet-based instruction should not be only perceived as a cognitive tool or a metacognitive tool; rather, it can be perceived and used as an epistemological tool. When the Internet is used as an epistemological tool for instruction, learners are encouraged to evaluate the merits of information and knowledge acquired from Internet-based environments, and to explore the nature of learning and knowledge construction.

Wen, Meichun Lydia; Tsai, Chin-Chung; Lin, Hung-Ming; Chuang, Shih-Chyueh (2004), through a LISREL analysis, in their study validated the Constructivist Internet-based Learning Environment Survey (CILES). CILES consisted of six scales, sorted by two aspects. The first aspect, the cognitive-metacognitive aspect, included the scales of student negotiation, inquiry learning, and reflective thinking, whereas the second aspect, the content-technical aspect, involved the scales of Relevance, Ease of Use, and Challenge. A LISREL structural model was also proposed to examine the relationships between students' responses across these two aspects. Survey responses gathered from 483 high school students in Taiwan were the research data for this study.

The results from the LISREL confirmatory analysis showed that CILES had highly satisfactory validity and reliability to assess students' preferences for constructivist Internet-based learning environments.

Moreover, the structural model indicated that the Internet learning environments that challenged students' existing concepts could facilitate their preferences for student negotiation, inquiry learning and reflective thinking activities. It is proposed that the Internet can have rich connections with numerous resources and a variety of perspectives, thus constructing appropriate learning environments to provide different kinds of challenges for learners

Teacher Candidates' Preferences Regarding Internet-based Learning Environments in Student-centered Education with Respect to the Programmes They are Enrolled at

The second research question was whether the preference distribution of the teacher candidates regarding internet-based learning environments in student-centered education show any difference with regards to the programme they are enrolled at?

Table: 4
Teacher Candidates' Preferences Regarding Internet-based Learning Environments in Student-centered Education with Respect to the Programmes They are Enrolled at

Programme	N	Mean	Std. Deviation	Std. Error
Computer and Educational Technologies	14	4,4571	,54025	,14439
Primary School Teaching	86	4,1512	,53220	,05739
Mathematics Teaching	90	4,3489	,51631	,05442
Total	190	4,2674	,53382	,03873

When average values are taken as the basis, Table: 4 demonstrates that candidates enrolled at Computer and Education Technologies Education have a higher preference of internet-based education environments.

This situation can be considered natural baring in mind that the aim of Computer and Educational Technologies Education programme is to engage candidates in education environments assisted with new technologies, equipping them with the basic skills and knowledge in their study area, and train candidates in guiding primary and secondary school students as Computer teachers. Variance analysis was conducted to see whether there is a difference in teacher candidates' preferences regarding internet-based learning environments with respect to the programmes they are enrolled at. The results of the variance analysis are demonstrated in Table: 5.

Table: 5
Variance Analysis about Teacher Candidates' Preference Regarding Internet-Based Learning and The Programmes They are Enrolled at

Variance Source	Sum of Squares	Sd	Mean Squares	F	*p*
Between Groups	2,264	2	1,132	4,102	,018
Within Groups	51,594	187	,276		
Total	53,858	189			

***p<0.05**

As can be seen from Table: 5, the variance analysis result of the candidates' scores on Constructivist Internet-based Education of Science Scale (CILES-S) is F=4,102 (p<0.05). According to this, it can be claimed that there is a meaningful difference between candidates enrolled at different programmes. Tukey HSD test was carried out to identify the source for the meaningful difference. The test results are shown in Table: 6.

Table: 6
Average Difference between Programmes

Programme	Comparison Proramme	Mean Difference	Std. Error	*p*
Computer and Educational Technologies (1)	2	,30598	,15138	,110
	3	,10825	,15091	,754
Primary School Teaching(2)	1	-,30598	,15138	,110
	3	,19773(*)	,07921	,036
Mathematics Teaching (3)	1	-,10825	,15091	,754
	2	,19773(*)	,07921	,036

***P<0.05**

When the findings in Table: 6 are analyzed based on candidates' preferences regarding internet-based education envrionments, it can be seen that there is a significant difference in averages in favour of Mathematics education when compared to primary education. The fact that teacher candidates' enrolled at mathematics programme receive their theoretical courses in a technology-assisted environment may have led these students to have a tendency for internet-based education environments.

Is there a difference in teacher candidates' preferences regarding student-centered internet-based learning environments with respect to the programme they are enrolled at?

Table: 7
Teacher Candidates' Distribution of Internet-based Learning Environments With Respect to the Programme They are Enrolled at

Learning Environments	Programme	N	Mean	Std. Deviation	Std. Error
Ease of use scale					
	Computer and Technologies	14	4,4286	,42141	,11263
	Primary School Mathematics	86	4,2116	,49215	,05307
	Teaching	90	4,3333	,53966	,05689
	Total	190	4,2853	,51321	,03723
Relevance scale					
	Computer and Technologies	14	4,3143	,61125	,16336
	Primary School Mathematics	86	4,0698	,55711	,06007
	Teaching	90	4,0933	,64735	,06824
	Total	190	4,0989	,60535	,04392
Multiple sources					
	Computer and Technologies	14	3,9000	,63124	,16871
	Primary School Mathematics	86	4,1047	,61489	,06631
	Teaching	90	4,1933	,55805	,05882
	Total	190	4,1316	,59179	,04293
Student negotiation scale	Computer and Technologies				
	Primary School Mathematics	14	4,0286	,70102	,18736
	Teaching	86	4,1907	,55975	,06036
	Total	90	4,2422	,68532	,07224
		190	4,2032	,63161	,04582
Cognitive apprenticeship scale	Computer and Technologies	14	4,4571	,54025	,14439
	Primary School Mathematics	86	4,1512	,53220	,05739
	Teaching	90	4,3489	,51631	,05442
	Total	190	4,2674	,53382	,03873
Reflective thinking scale	Computer and Technologies	14	4,3429	,59448	,15888
	Primary School Mathematics	86	4,1884	,54480	,05875
	Teaching	90	4,2867	,46645	,04917
	Total	190	4,2463	,51307	,03722
Critical judgment scale	Computer and Technologies	14	4,4143	,38801	,10370
	Primary School Mathematics	86	4,2279	,54550	,05882
	Teaching	90	4,3711	,48488	,05111
	Total	190	4,3095	,51044	,03703
Epistemological awareness scale	Computer and Technologies	14	4,1429	,34578	,09241
	Primary School Mathematics	86	3,8721	,62566	,06747
	Teaching	90	4,0733	,64960	,06847
	Total	190	3,9874	,62796	,04556
Total					
	Computer and Technologies	14	4,2527	,33308	,08902
	Primary School Mathematics	86	4,1237	,39275	,04235
	Teaching	90	4,2396	,38794	,04089
	Total	190	4,1881	,38901	,02822

Table: 8
Variance Analysis Results Related to Internet-based Education Environments of Teacher Candidates

Learning Environments	Variance Source	Sum of Squares	Sd	Mean Squares	F	*p*
Ease of use scale	Between Groups	,962	2	,481	1,842	,161
	Within Groups	48,817	187	,261		
	Total	49,779	189			
Relevance scale	Between Groups	,725	2	,363	,989	,374
	Within Groups	68,535	187	,366		
	Total	69,260	189			
Multiple sources	Between Groups	1,156	2	,578	1,663	,192
	Within Groups	65,034	187	,348		
	Total	66,191	189			
Student negotiation scale	Between Groups	,577	2	,289	,722	,487
	Within Groups	74,821	187	,400		
	Total	75,398	189			
Cognitive apprenticeship scale	Between Groups	2,264	2	1,132	4,102	*,018*
	Within Groups	51,594	187	,276		
	Total	53,858	189			
Reflective thinking scale	Between Groups	,566	2	,283	1,075	,343
	Within Groups	49,187	187	,263		
	Total	49,752	189			
Critical judgment scale	Between Groups	1,068	2	,534	2,073	,129
	Within Groups	48,175	187	,258		
	Total	49,243	189			
Epistemological awareness scale	Between Groups	2,146	2	1,073		
	Within Groups	72,383	187	,387	2,773	,065
	Total	74,530	189			
Total	Between Groups	,654	2	,327	2,186	,115
	Within Groups	27,948	187	,149		
	Total	28,601	189			

***P<0.05**

As Table: 8 demonstrates, it can be seen that, based on the programmes that teacher candidates are enrolled at, there is a significant difference of 0.05 in average scores regarding the internet-based learning environment, pointing to the fact that the programmes are a factor in the area of Cognitive Development.

Teacher Candidates' Preferences Regarding Internet-based Learning in Student-centered Education with Regard to Their Gender

Table: 9 shows the sample groups' preferences regarding internet-based learning in student-centered education and their distribution with respect to gender.

Table: 9
Teacher Candidates' Preference Distribution of Internet-based Learning Environments in Student-centered Education with Regards to Their Gender

Learning Environments	Gender	N	Mean	Std. Deviation	t	p
Ease of use scale	Female	129	4,3039	,49756	,726	,832
	Male	61	4,2459	,54698		
Relevance scale	Female	129	4,1240	,56745	,830	,079
	Male	61	4,0459	,68058		
Multiple sources	Female	129	4,1566	,53090	,847	,074
	Male	61	4,0787	,70548		
Student negotiation scale	Female	129	4,1814	,62221	-,690	,600
	Male	61	4,2492	,65387		
Cognitive apprenticeship scale	Female	129	4,2574	,50756	-,375	,557
	Male	61	4,2885	,58938		
Reflective thinking scale	Female	129	4,2589	,48888	,491	,627
	Male	61	4,2197	,56416		
Critical judgment scale	Female	129	4,3163	,46280	,267	,576
	Male	61	4,2951	,60289		
Epistemological awareness scale	Female	129	3,9612	,62753	-,833	,985
	Male	61	4,0426	,63047		
Total	Female	129	4,1910	,37202	,149	,561
	Male	61	4,1820	,42590		

***p <0.05**

Another research question of the study was whether teacher candidates' preferences regarding the internet-based learning environments in student-centered education shows any difference with respect to their gender. The findings in Table 9 indicate that gender is not a significant factor at the level of 0.05 when teacher candidates' preferences on internet-based learning environments in student-centered education is the concern. Lee, Min-Hsien and Tsai, Chin-Chung (2005), in their study, explores high school students' and teachers' preferences toward the constructivist Internet-based learning environments in Taiwan. In their study, male students placed more emphasis on the student negotiation, critical judgement and epistemological awareness enhanced by the Internet-based learning environments than female students did.

Peng, Hsinyi; Tsai, Chin-Chung; Wu, Ying-Tien (2006), according to their study, the attitudes and the self-efficacy that characterize learners relative to the Internet have been identified as important factors that affect learners' motivation, interests and performance in Internet-based learning environments. Meanwhile, learners' perceptions of the Internet may shape learners' attitudes and online behaviours.

This study investigates university students' attitudes and self-efficacy towards the Internet, and explores the role that university students' perceptions of the Internet may play in their Internet attitudes and self-efficacy. The results indicate that university students demonstrate positive attitudes and adequate Internet self-efficacy and that these students are more inclined to view the Internet as a functional tool--a functional technology.

Gender differences exist in university students' attitudes towards, and perceptions of, the Internet; that is, male students demonstrate Internet attitudes that are more positive than those of their female peers.

Furthermore, students who perceive the Internet as a leisure tool show more positive attitudes and communicative self-efficacy than students who use the Internet as a functional technology. Educators and researchers need to be aware of these differences and to take them into consideration in their instruction. Lastly, this study serves as a starting-point for research that more broadly explores learners' perceptions of the Internet.

Teacher Candidates' Preferences Regarding Internet-based Learning Environments in Student-centered Education with Respect to Their Class

What is the distribution of teacher candidates' preferences regarding internet-based learning environments in student-centered education with respect to the class they are enrolled at and is there any difference?

Table: 10
The Distribution of Teacher Candidates' Preferences about Internet-based Learning Environments with Respect to Their Class

Learning Environments	Class	N	Mean	Std. Deviation	Std. Error
Ease of use scale	1	20	4,4500	,44898	,10039
	2	112	4,2768	,51377	,04855
	3	29	4,3241	,46419	,08620
	4	29	4,1655	,58571	,10876
	Total	190	4,2853	,51321	,03723
Relevance scale	1	20	4,1100	,66006	,14759
	2	112	4,0679	,61837	,05843
	3	29	4,1724	,57252	,10631
	4	29	4,1379	,56847	,10556
	Total	190	4,0989	,60535	,04392
Multiple sources	1	20	4,3100	,60341	,13493
	2	112	4,0857	,54008	,05103
	3	29	4,1724	,58487	,10861
	4	29	4,1448	,76513	,14208
	Total	190	4,1316	,59179	,04293
Student negotiation scale	1	20	4,4200	,51463	,11507
	2	112	4,1786	,62348	,05891
	3	29	4,2828	,67510	,12536
	4	29	4,0690	,67459	,12527
	Total	190	4,2032	,63161	,04582
Cognitive apprenticeship scale	1	20	4,1700	,60966	,13632
	2	112	4,2625	,51081	,04827
	3	29	4,3310	,51900	,09638
	4	29	4,2897	,59662	,11079
	Total	190	4,2674	,53382	,03873
Reflective thinking scale	1	20	4,2700	,58499	,13081
	2	112	4,2536	,47646	,04502
	3	29	4,2621	,46013	,08544
	4	29	4,1862	,65450	,12154
	Total	190	4,2463	,51307	,03722

Critical judgment scale	1	20	4,5200	,39149	,08754
	2	112	4,3089	,47714	,04509
	3	29	4,2897	,53342	,09905
	4	29	4,1862	,64792	,12032
	Total	190	4,3095	,51044	,03703

Epistemological awareness scale	1	20	4,0400	,55668	,12448
	2	112	3,9446	,68823	,06503
	3	29	4,0897	,52259	,09704
	4	29	4,0138	,52896	,09823
	Total	190	3,9874	,62796	,04556
Total	1	20	4,2769	,39273	,08782
	2	112	4,1690	,35685	,o3372
	3	29	4,2378	,38892	,07222
	4	29	4,1512	,49966	,09279
	Total	190	4,1881	,38901	,02822

Table: 11
The Variance Analysis of Teacher Candidates' Preferences Regarding Internet-based Learning Environments with Regard to the Class They are Enrolled at

Learning Environments	Variance Source	Sum of Squares	Sd	Mean Squares	F	*p*
Ease of use scale	Between Groups	1,010	3	,337	1,285	,281
	Within Groups	48,768	186	,262		
	Total	49,779	189			
Relevance scale	Between Groups	,311	3	,104	,280	,840
	Within Groups	68,948	186	,371		
	Total	69,260	189			
Multiple sources	Between Groups	,926	3	,309	,879	,453
	Within Groups	65,265	186	351		
	Total	66,191	189			
Student negotiation scale	Between Groups	1,714	3	,571	1,442	,232
	Within Groups	73,684	186	,396		
	Total	75,398	189			
Cognitive apprenticeship scale	Between Groups	,324	3	,108	,375	,771
	Within Groups	55,533	186	,288		
	Total	53,858	189			
Reflective thinking scale	Between Groups	,129	3	,043	,161	,922
	Within Groups	49,623	186	,267		
	Total	49,752	189			
Critical judgment scale	Between Groups	1,338	3	,446	1,732	,162
	Within Groups	47,904	186	,258		
	Total	49,243	189			
Epistemological awareness scale	Between Groups	,584	3	,195		
	Within Groups	73,946	186	,398	,489	,690
	Total	74,530	189			

Total	Between Groups	,310	3	,103		
	Within Groups	28,291	186	,152	,680	,566
	Total	28,601	189			

***p<0.05**

Another research question of the study was whether teacher candidates' preferences regarding the internet-based learning environments in student-centered education shows any difference with respect to their class.

The findings in Table: 11, indicate that class is not a significant factor at the level of 0.05 when teacher candidates' preferences on internet-based learning environments in student-centered education is the concern.

Sellers, Rebecca G.; Wright, Kenneth E.; Wright, Vivian H. (2003), the purpose of their study was to compare and contrast perceptions and attitudes of graduate students enrolled in an allied health program who access the same course material from a distance via the Internet with those students who may also access course material via the Internet, but who also have the opportunity to attend traditional on-campus class meetings.

Two groups were defined based on residential status. The interactions of residential status and other independent variables affected some attitudes toward learning environments. Students who were under 25 years of age disagreed that an online learning environment gave them the ability to take a more active role in learning. Students with higher grade point averages were least satisfied with electronic access to library materials. Students who waited at least 4 years before returning to school were least satisfied with accessing resources through the Internet.

This study provides a snapshot of a particular student population at a particular moment and offers implications for educators interested in offering and developing on-line graduate programs.

RESULTS AND DISCUSSIONS

The sample group of teacher candidates in the study showed differences with respect to their preferences regarding internet-based learning in student-centered education. The candidates scored higher in the internet-based learning environments of Cognitive Development and Critical Judgement. The lowest average scores of the sample group were observed in the internet-based learning environment of Episthemologic awareness. Teacher candidates preferred to evaluate and criticize different information reached from internet-based environments, besides, they preferred expert guidance in reaching useful information. Educators and web content developers should carefully present opportunities to promote critical self-reflective thinking and to critically evaluate information in the Internet-based science learning environments.

The findings of the study, as can be seen from Table-3, suggest that teacher candidates do not favour the internet-based learning environment of Episthemological awareness which refers to the candidates' getting information about the roots, the origins, formation and development of knowledge. However, the candidates who participated in this study, preferred other internet-based learning environments more than the other envirnments. A significant difference was observed between the study areas, the programmes that they follow. With respect to teacher candidates' preferences regarding internet-based learning environments, a significant difference was observed between primary school education and mathematics education, referring to an advantage of the mathematics group.

The internet-based learning environment scores of candidates enrolled at Computer and Educational Technologies Education was the highest among groups.

Teacher candidates enrolled at Computer and Educational Technologies Education recieve education in an environment that is assited with new technologies. Teacher candidates enrolled at the Mathematics programme receive their theoretical courses in technology-assisted educational environments. Thus, it is natural that teacher candidates in these programmes tend to show higher preference to internet-based learning environments. When the average scores of the teacher candidates' preferences regarding internet-based learning environments in student-centered education were considered, gender did not come out as a significant factor.

When the average scores of the teacher candidates' preferences regarding internet-based learning environments in student-centered education were considered, the class candidates were enrolled at did not come out as a significant factor.

Today, applying an internet-based learning environment is affective in making technology appealing to learners and assisting learners in long-term information retention. Studies in this area, based on assessment results, indicate that these environments increase learners' success, performance, and motivation levels.

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REFERENCES

Wen, M. L.; Tsai, Chin-Chung; Lin, Hung-Ming; Chuang, Shih-Chyueh. (2004). Cognitive-Metacognitive and Content-Technical Aspects of Constructivist Internet-Based Learning Environments: A LISREL Analysis. *Computers and Education*, 43 (3), 237-248.

De La Harpe, B., Kulski, M. and Radloff, A. (1999). How Best to Document The Quality of Our Teaching and Our Students' Learning? In: Martin, K., Stanley, N. and Davison, N., Editors, *Teaching in The Disciplines: Learning in Context. Proceedings of The Eighth Annual Teachin Learning Forum, The University of Western Australia.* University of Western Australia, Perth.

Deryakulu, D. (2000). Yapıcı Öğrenme. *Sınıfta Demokrasi.* Editör: Şimşek, A. (sayfa: 53-77) Ankara: Eğitim Sen Yayınları. [Constructive leraning. *Democracy in schoolroom*. In: Simsek, A. Editor. (p:53–77). Ankara.].

Gibbs, G. (1992). *Assessing More Students*. Oxford Brookes University, Oxford.

Giles, J., Ryan, Daniel A.J., Belliveav, G., De Freitas, E., Casy, R. (2006). Teaching Style and Learning in a Quantitative Classroom (EJ74429). Active Learning in Higher Education: *The Journal of the Institute for Learning and Teaching*. 7 (3), 213–225.

Hannafin M.J. and Land S.M. (1997). The Foundations and Assumptions of Technology Enhanced Student-Centered Learning Environments, *Instructional Science* 25 (3), 167–202.

Isman, A. (2005). *Ogretim Teknolojileri ve Materyal Gelistirme*. II. baskı Sempati. Ankara. [Teaching Technology and Material Development. Ankara.].

Katz, R.N. (1999). *Dancing with the devil: Information technology and the new competition in higher education*. Jossey Bass, San Francisco.

Lee, Min-Hsien and Tsai, Chin-Chung (2005). Exploring High School Students' and Teachers' Preferences toward the Constructcivist Internet-based Learning Environments İn Taiwan. *Educational Studies*, 31 (2), 149-167.

Means, (1994). Introduction: Using Technology to Advance Educational Goals. In: B. Means, Editor, *Technology and Education Reform: The Reality Behind The Promise*, Jossey-Bass, San Francisco.

Oblinger, D. G., and Maruyama M. K. (1996). Distributed Learning. Boulder, CO: Cause Professional Paper Series, 14.

Ozcelik, D. Ali. (1989). *Test Hazırlama Kılavuzu*. İkinci Baskı. Ankara: OSYM Egitim Yayinlari 5. [*Test Preparation Guide.* Ankara:OSYM press.].

Ozdamar, K. (2002). *Paket Programlari ile Istatiksel Veri Analizi I*. 4. baskı. Eskisehir: Kaan Kitabevi. [Statistical *Data Analysis with Package.* Eskişehir].

Peng, Hsinyi; Tsai, Chin-Chung; Wu, Ying-Tien. (2006). University Students' Self-Efficacy and Their Attitudes Toward the Internet: The Role of Students' Perceptions of the Internet. *Educational Studies*, 32 (1), 73-86.

Sellers, Rebecca G.; Wright, Kenneth E.; Wright, Vivian H. (2003). Attitudes and Perceptions of On- and Off-Campus Students of an Internet-Based Graduate Allied Health Program.

Tsai, Chin-Chung. (2004). Beyond Cognitive and Metacognitive Tools: The Use of the Internet as an Epistemological Tool for Instruction. *British Journal of Educational Technology*, 35 (5), 525-536.

Wen, Meichun Lydia; Tsai, Chin-Chung; Lin, Hung-Ming; Chuang, Shih-Chyueh. (2004). Cognitive-Metacognitive and Content-Technical Aspects of Constructivist Internet-Based Learning Environments: A LISREL Analysis. *Computers and Education*, 43 (3), 237-248.

Yasar, S. (1998). Yapısalci kuram ve ogrenme-ogretme süreci. *VII. Ulusal Eğitim Bilimleri Kongresi (9-11 Eylül)-I.* (sayfa:695-699). Konya: Selçuk Universitesi. [Constructivist theory and learning-teaching process. *VII. National Conference of Education Science (9-11 Eylül)-I.* (p: 695-699). Konya: Selcuk University.].

Http://www.vathena.arc.nasa.gov . 06.12. 2006