MATH ATTITUDES OF COMPUTER EDUCATION AND INSTRUCTIONAL TECHNOLOGY STUDENTS

Mehmet Tekerek
KSU, CEIT Department, Turkey, tekerek@ksu.edu.tr

Betül Yeniterzi
METU, EME Department, Turkey, ybetul@metu.edu.tr

Orhan Ercan
KSU, ESE Department, Turkey, oercan@ksu.edu.tr

ABSTRACT
Computer Education and Instructional Technology (CEIT) Departments train computer teachers to fill gap of computer instructor in all grades of schools in Turkey. Additionally graduates can also work as instructional technologist or software developer. The curriculum of CEIT departments includes mathematics courses. The aim of this study is to identify attitudes of undergraduate students at CEIT departments towards math. In order to investigate the research question quantitative methods was used. Specifically survey research was preferred. Mathematics Attitude Questionnaire (MAQ) that was developed by Duatepe and Çilesiz (1999) was used and the questionnaire includes 38 items. The instrument was conducted with 122 undergraduate students from CEIT departments of four different universities in Turkey in the spring semester of 2010- 2011. Data were analyzed through independent samples t-test and one-way ANOVA by means of PASW Statistics-18. In conclusion, some differences were found in terms of math attitudes of CEIT's students.
Keywords: CEIT Students, Computer Education, Math Attitudes, Math Courses.

INTRODUCTION

As it is known departments of Computer Education and Instructional Technologies (CEIT) were founded in 1998 by reconstructing education faculties in Turkey (Şahinkayası & Şahinkayası, 2004) and there are no departments like CEIT in the world except Turkey. The basic purposes of department of CEIT can be ordered as, for education foundations enhancing the methods and techniques which are essential for functional use of computer and instruction technologies' products, teaching and expanding these methods and techniques and training individuals who want to be teachers in these foundations.

Today, in Turkey the students who want to get training in the departments of CEIT must have YGS-1 scores. In YGS exam, math composes 40 % of the whole questions. The questions of math in this exam are based on elementary and first grade of high school curricula. Hence, undergraduate students who enrolled in the departments of CEIT may probably have no high levels of math knowledge. However at contents of courses in the departments of CEIT, there are intensive content of mathematics courses. For instance Math I course includes the topics such as, the concept of functions, the concept of limits, the concept of derivatives, equations of tangent and normal, curve sketching (YÖK, 2011).

In math education, the importance of attitude towards math is emphasized mostly. Attitude towards math has been researched for determining from the point of particular grade of students and different viewpoints (Tocci, 1991, Rounds & Hendel, 1980, Tabuk & Özdemir, 2010). According to Tezer and Karasel (2010), generally the relationship between attitude towards math and achievement in math is investigated and concluded that attitude towards math influences achievement in math.

A survey study was conducted by Köğce, Yıldız, Aydın and Altındağ (2009) with the purpose of determining and comparing the second grade elementary students' attitudes towards math. The researchers used the same instrument with this study but they adapted the scale for conducting to elementary students. They reached some statistically significant differences between attitude scores towards math and receiving private tuition at grade 6 and 7, math achievement score and educational background of parents, profession of fathers at grade 6 and 8, profession of mothers at grade 6 and lastly grade level of students in elementary schools. Additionally they did not find significant difference in terms of gender. Another study was applied to secondary school students by Yara (2009) and it was found that the students have positive attitudes towards math and they think that math is crucial and necessary for their future life.

Ma (1997) conducted a research which is related with reciprocal relationships between attitude towards math and achievement in math to approximately a thousand high school seniors. The researcher concluded that fathers have more effect in their children's achievement in math while mothers have more effect on their children's attitude

towards math. Another result of this study is mothers who have lower education level have more effects on their children's awareness of importance of math so the researcher pointed out this may be a result of that mothers' feelings of deficiencies in terms of education and occupation. And the researcher added culture can affect the attitudes towards math more than the achievement in math in terms of children' parents' education level. Moreover it is found out; gender differences of students do not have an effect on the attitudes. According to Ma (1997); being a successful student at math does not mean that student have less concern about attitude towards math.

Sırmacı (2007) investigated the university students' anxiety and attitudes towards math. The researcher found that female students have more positive attitudes in terms of benefits of the perceived math and parents' attitudes towards math. And she did not find significant difference between attitudes towards math and the students' graduated schools from and the occupation of students' fathers.

According to Duatepe and Çilesiz (1999); it is seen that most of the undergraduate students who are unsuccessful at math for whom it is an obligatory course in the first year of curriculum of universities, have negative ideas about the math course. At the departments of CEIT content of courses requires substantial math content knowledge. However in a research, which was conducted with final-year students and graduates of the departments of CEIT, it was found that science and math courses are viewed as the least useful courses (Acat, Kılıç, Girmen & Anagün, 2007). At this point, according to a master thesis's result which is about the effect of the mathematical knowledge background of the computer education students to their undergraduate education, it is concluded that students who have more powerful math knowledge have more probability to be successful at CEIT departments (İşlek, 2007).

The main purpose of this study is to determine attitudes of undergraduate students at CEIT departments towards mathematics. The variables that can affect the students' attitudes towards mathematics were investigated in terms of gender, type of graduated high school, grade of high school diploma, YGS-1 score, which they received, their fathers' education level, their mothers' education level, grade of Information Technologies (IT) in Education I course and lastly grade of Mathematics I course.

METHOD
In the study descriptive model being one of the research methods, was used in order to determine the attitude of CEIT students towards math. Descriptive models are approaches that aim to describe an incident in the way it exists or used to exist. The incident that needs to be known exists and it is out there. The important issue is to observe it in an appropriate way and to detect it (Karasar, 2000). The data of the study were collected by means of "Math Attitude Scale" developed by Duatepe and Çilesiz (1999). The Cronbach's Alpha reliability coefficient of the original scale is 0.96. The reliability coefficient (Cronbach's Alpha) of the scale for this study was found to be 0.96 which is the same value with the original scale. The data were then analyzed and interpreted by means of PASW Statistics 18. In the analysis of data, independent sample t test was used in order to determine whether there is a significant difference among students' attitude towards math as regards their gender and their mothers' education levels. One way ANOVA was used in order to determine whether there is a significant difference among students' attitude towards math as regards their type of graduated high school, grade of high school diploma, YGS-1 score which they received, their fathers' education level, grade of IT in Education I course and lastly grade of Math I course. Reliability level is p=0.05.

The research problem was stated as "What are the attitudes towards math course of the first year undergraduate students at the departments of CEIT? This problem was examined by the sub-problems: Is there a statistically significant difference between total math attitude scores and respectively gender, type of graduated high school, grade of high school diploma, YGS-1 score, mother's education level, father's education level, grade of Information Technologies in Education I course, grade of Math I course?

Sample
The population of the study was faculty of educations which have CEIT Departments in Turkey. The sample of the study consisted of 122 CEIT students, who are taking or have taken Math I course at the CEIT Departments in four universities in Turkey. At this point the purpose was to encounter the students with math in recent time so; it was aimed to provide reflecting consistent and real answers in questionnaire about math attitude. The sample and the universities were randomly selected for the study. The participant students were reached via e-mail and they replied back through e-mails as voluntarily.

Table 1 shows that students' properties which are gender, type of graduated high school, grade of high school diploma, YGS-1 score which they got, their mothers' education level, their fathers' education level, grades of IT in Education I course and grades of Math I course.

As seen by Table 1, 47,5 % of the participants are male students (n= 58) and 52,5 % of the participants are female students (n=64). The majority of participant students who graduated from vocational high school are composed nearly the sample's half. The ratio of them is 48,4 % (n=59).It was also found out that 43,4 % (n=53) of the students' grades of high school diploma is in the interval of 4.51-5,00. Also it can be seen that from Table 1, 43,4 % (n=53) of the students' got from YGS-1 400-419 score. The students' mothers' education levels are mostly elementary education or illiterate. The ratio of them is 72,1 % (n=88). And the students' fathers' education levels are mostly elementary education or illiterate, the ratio of them is 44,3 % (n=54). 40,2 % (n=49) of the students got BB- BA from Information Technology in Education I course. The students' 30,3 % (n=37) got CC- CB from Math I course.

To decide whether conducting parametric or nonparametric tests, Kolmogrov Smirnov test and test of homogeneity of variances in ANOVA were conducted. At the end of these analysis since it was reached the value of $p>0,05$, it was decided that the data had normal distribution and were homogeneous. Thus parametric tests were conducted to the data.

Table 1. Demographic properties of students that took part in the study

	Property	*f*	*%*		*Property*	*F*	*%*
Gender	Male	58	47,5	Type of Graduated (High school)	General high school	38	31,1
					Vocational high school	59	48,4
	Female	64	52,5		Anatolian high school	25	20,5
Diploma Grade (High School)	4,00 and below	29	23,8	YGS-1 Score	400- 419	53	43,4
	4,01-4,50	40	32,8		420- 439	28	23,0
	4,51-5,00	53	43,4		440-+	41	33,6
Mother' Education Level	Illiterate and Elementary Education	88	72,1	Father' Education Level	Illiterate and Elementary Education	54	44,3
					Secondary Education	37	30,3
	Secondary Education and above	34	27,9		College and above	31	25,4
IT in Education I Grade (Course)	AA	20	16,4	Math I Grade (Course)	BB-BA and above	30	24,6
	BB-BA	49	40,2		CC-CB	37	30,3
	CC-CB	24	19,7		DD-DC	20	16,4
	DD-DC and below	29	23,8		FF-FD	35	28,7

Data collection
CEIT students' math attitudes were determined by "Math Attitude Scale" developed by Duatepe and Çilesiz (1999) and personal information was collected by "Personal Information Survey". In the math attitude scale there are 38 items; of which 22 are negative and 16 are positive; in 4 factors. These factors are "like and interest, anxiety and confidence, occupational and daily importance, enjoyment".

Findings
Below there is a summary of the findings from the study and some remarks on them. In the study the attitude of students towards math was analyzed statistically according to their gender by an independent sample t test. The results are given in Table 2.

Table 2. Independent sample t test analysis results according to gender*

	Gender	*n*	*∑X*	*SD*	*Levene Test*		*Df*	*t*	*p*
					F	*p*			
Total math attitude score	Female	58	137,88	28,52	3,276	0,073	120	3,465	0,001
	Male	64	118,39	33,13					

It was seen from Table 2 that female students ($\sum X$=137,87) have more positive attitude than male students ($\sum X$ =118,39) towards math. The relation between the total math attitude score of the students and their gender was analyzed and it was seen that there is a significant difference ($t_{(120)}$=3,465; p< 0,05). This result showed that there is a significant difference between the gender and the total math attitude score in favor of female students.

It was aimed to analyze the attitude of students towards math as regards the type of graduated high school, and one way ANOVA was conducted. The results are given in Table 3.

Table 3. One way ANOVA for the attitude as regards type of graduated high school*

	Graduated High School Type	n	$\sum X$	SD	Source of variance	Sum of Squares	Df	F	p
Total math attitude score	General High School	38	138,45	26,34	Between groups	19475,08	2		
	Vocational High School	59	114,66	32,54				10,77	0,00
	Anatolian High School	25	141,92	29,22	Within group	107604,46	119		

When Table 3 was analyzed, it was seen that the total attitude scores towards math is the highest ($\sum X$ = 141,92) for the students, who graduated from Anatolian high school. There is a significant difference between type of graduated high school and the total attitude scores towards math ($F_{(2,119)}$= 10,77; p < 0,05). In order to find out among which group this difference results from, Scheffe analysis in ANOVA was applied. It was understood that the total math attitude scores for general high school ($\sum X$= 138,45) is significantly different from vocational high school ($\sum X$ = 114,66) and the total math attitude scores for Anatolian high school ($\sum X$= 141,92) is significantly different from vocational high school ($\sum X$ = 114,66). The students who graduated from Anatolian high school and general high school have more positive attitude towards math separately compared with the students who graduated from vocational high school.

It was aimed to analyze the attitude of students towards math as regards grades of high school diploma. For this analysis one way ANOVA was conducted to the data and the results are given in Table 4.

Table 4. One way ANOVA for attitude as regards grades of high school diploma variable*

	High School Diploma Grades	n	$\sum X$	SD	Source of variance	Sum of squares	Df	F	p
Total Math attitude score	4,00 and below	29	123,58	38,00	Between groups	1810,06	2	0,86	0,426
	4,01-4,50	40	133,03	30,88					
	4,51-5,00	53	125,83	30,27	Within group	125269,48	119		

When Table 4 was analyzed, it can be seen that the total attitude scores towards math is the highest ($\sum X$ = 133,03) for the students whose grades of high school diploma is in the interval of 4,01- 4,50. There is no statistically significant difference between grades of high school diploma and the total attitude scores towards math ($F_{(2,119)}$= 0,86; p > 0,05).

The attitude of students towards math was analyzed as regards YGS-1 score which they got. For this analysis one way ANOVA was applied to the data and the results are given in Table 5.

Table 5. One way ANOVA for the attitude as regards YGS-1 score variable*

	YGS-1 Score	N	$\sum X$	SD	Source of variance	Sum of Squares	Df	F	p
Total Math attitude score	400- 419	53	127,00	29,90	Between groups	8068,08	2	4,034	0,020
	420- 439	28	115,11	38,88					
	440 +	41	137,07	28,14	Within group	119011,46	119		

When Table 5 was analyzed, it was seen that the total attitude scores towards math is the highest ($\sum X$ = 137,07) for the students, who got 440 and above from YGS-1. There is a significant difference between grades of YGS-1 score and the total attitude scores towards math ($F_{(2,119)}$= 4,034; p < 0,05). In order to find out among which group this difference results from, Scheffe analysis was applied in ANOVA. It was understood that the total math attitude scores for the students who got 420-439 from YGS-1 ($\sum X$ =115,11) is significantly different from the students who got 440 and above from YGS-1 ($\sum X$ = 137,07). The students who got 440 and above from YGS-1, have more positive attitude towards math than the students who got 420- 439 from YGS-1.

In the study it was also aimed to analyze the attitude of students towards math as regards their mothers' education level. For this analysis independent sample t-test was conducted to the data and the results are given in Table 6.

Table 6. Independent sample t test analysis results according to mothers' education level variable*

	Mothers' education level	n	∑X	SD	Levene Test		Df	t	p
					F	p			
Total math attitude score	Illiterate and Elementary Education	88	129,38	31,64	0,072	0,79	120	0,942	0,348
	Secondary Education and Above	34	123,21	34,40					

When Table 6 was analyzed, it can be seen that the students whose mother' education levels are elementary education or illiterate (∑X =129,38) have more positive attitude than the students whose mother' education levels are secondary education and above (∑X =123,21). The relation between the total math attitude score of the students and their mothers' education levels was analyzed and it was seen that there is no significant difference ($t_{(120)}$=0,942; p> 0,05). This result shows that there is no significant relation between the students' mothers' education levels and the total math attitude scores.

In the study the attitude of students towards math was analyzed as regards their fathers' education level. For this analysis one way ANOVA was applied to the data and the results are given in Table 7.

Table 7. One way ANOVA for the attitude as regards their fathers' education level variable*

	Fathers' education level	n	∑X	SD	Source of variance	Sum of squares	Df	F	p
Total Math attitude score	Illiterate and Elementary Education	54	121,07	33,43	Between groups	6648,36	2	3,285	0,041
	Secondary Education	37	138,38	32,58					
	College and above	31	126,32	25,42	Within group	120431,18	119		

When Table 7 was analyzed, it can be seen that the total attitude scores towards math is the highest (∑X = 138,38) for the students whose father' education levels are secondary education. There is a significant difference between the students' fathers' education levels and the total attitude scores towards math ($F_{(2,119)}$= 3,285; p < 0,05). In order to find out among which group this difference results from, Scheffe analysis in ANOVA was applied. It is understood that the total math attitude scores for the students whose fathers' education levels are elementary school or illiterate (∑X = 121,07) is significantly different from the students whose fathers' education levels are secondary education (∑X = 138,38). The students whose fathers' education levels are secondary education have more positive attitude towards math than the students whose fathers' education levels are elementary school or illiterate.

In the study it was also aimed to analyze the attitude of students towards math as regards students' grades of IT in Education I course. For this analysis one way ANOVA was conducted to the data and the results are given in Table 8.

Table 8. One way ANOVA for the attitude as regards grades of IT in Education I course variable*

	IT in Education-I Course Grade	n	∑X	SD	Source of variance	Sum of Squares	Df	F	p
Total Math attitude score	AA	20	123,40	36,19	Between groups	1763,09	3	0,553	0,647
	BB-BA	49	126,86	29,42					
	CC-CB	24	125,04	37,68					
	DD-DC and below	29	134,10	30,60	Within group	125316,45	118		

When Table 8 is analyzed, it was seen that the total attitude scores towards math is the highest (∑X = 134,10) for the students whose grades of IT in Education I course are DD- DC or below. There is no statistically significant difference between the students' grades of IT in Education I course and the total attitude scores towards math ($F_{(3,118)}$= 0,553; p > 0,05).

Lastly in the study it was also aimed to analyze the attitude of students towards math as regards students' course grades of Math I. For this analysis one way ANOVA was conducted to the data and the results are given in Table 9.

Table 9. One way ANOVA for the attitude as regards grades of Math I variable*

	Math-I Course Grade		n	$\sum X$	SD	Source of variance	Sum of Squares	Df	F	P
Total Math attitude score	BB-BA above	and	30	142,27	27,73	Between groups	15859,23	3		
	CC-CB		37	133,22	31,58				5,609	0,001
	DD-DC		20	111,00	38,25	Within group	111220,31	118		
	FF-FD		35	118,77	27,24					

When Table 9 was analyzed, it was seen that the total attitude scores towards math is the highest ($\sum X$ = 142,27) for the students whose grades of Math I course are BB- BA or above. There is a statistically significant difference between the students' grades of Math I course and the total attitude scores towards math ($F_{(3,118)}$= 5,609; p < 0,05). In order to find out among which group this difference results from, Scheffe analysis in ANOVA was applied. It is understood that the total math attitude score for the students who got BB- BA ($\sum X$ = 142,27) or above from Math I course is significantly different from the students who got DD- DC ($\sum X$ = 111,00) and FF- FD ($\sum X$ = 118,77) from Math I course. The students who got BB- BA or above from Math I course have more positive attitude towards math than the students who got DD- DC and FF- FD from Math I.

DISCUSSIONS AND CONCLUSIONS
This study was conducted by the idea of computer science is a field that requires the ability of analytic thinking and in respect of CEIT departments' extent, it is important to determine students' attitudes towards math. The obtained results can be summarized as below.

It was found that there is a significant difference between the gender and the total math attitude score in favor of female students. Although Ma (1997)'s, Farooq and Shah (2008)'s, Köğce, et al. (2009)'s and Uşun and Gökçen (2010)'s studies reached the result that indicated gender of the students do not affect their attitudes towards math, this study found that female students have more positive attitudes towards math than male students. Yenilmez (2007)'s research result supported this result.

According to type of graduated high school a significant difference is found in terms of total math attitude scores. It was understood that the students who graduated from Anatolian high school and general high school have more positive attitude towards math separately compared with the students who graduated from vocational high school. However Sırmacı (2007)'s study stated that students who have anxiety towards math have negative attitude towards math and the study concluded that there is no significant difference between the type of graduated high school and anxiety towards math.

Another result was that students whose grades of high school diploma are in the interval of 4,01- 4,50 have more positive attitude towards math. There is no statistically significant difference between grades of high school diploma and the total attitude scores towards math.

In the study it was concluded that there is a significant difference between grades of YGS-1 score and the total attitude scores towards math. The students who got 440 and above from YGS-1, have more positive attitude towards math than the students who got 420- 439 from YGS-1. When it was considered math questions consist of 40 % of YGS-1 exam, this result is not surprising.

The students whose mothers' education levels are elementary education and illiterate, have more positive attitude than the students whose mother' education levels are secondary education and above and there is no significant difference between the students' mothers' education levels and the total math attitude scores. Yenilmez (2007) in his study did not find a significant difference between attitude towards math and mothers' and fathers' education level. However in this study there is a significant difference between the students' fathers' education levels and the total attitude scores towards math. The students whose fathers' education levels are secondary education have more positive attitude towards math than the students whose fathers' education levels are elementary school or illiterate. On the other hand according to Ma (1997)'s study; fathers affect students' math achievement while mothers affect children's attitude towards math.

There is no significant difference between attitude and grades of Information Technologies in Education I course. It was found that the total attitude scores towards math is the highest for the students whose grades of IT in Education I course are DD- DC or below, this seems interesting.

Lastly in the study the attitude of students towards math was analyzed as regards students' course grades of Math I. It can be said that the students whose grades of Math-I course are BB- BA or above have more positive attitude towards math. It is an expected result.

Besides all these results, it was thought that the students who are enrolled the CEIT departments with YGS-I, encounters with Math-2 courses subjects primarily so this situation can cause the students have negative attitudes towards math.

Another important result was that students, who are successful at Information Technology in Education I course, are mostly graduated from vocational high schools and they have less positive attitudes towards math.

Reforming of the CEIT Departments' curricula in terms of math attitudes of the students is essential. Students of the departments should have the ability of analytical thinking and this ability should be existing either prior to the beginning of the studies (at the high school level) or should be given to the departments students by means of academic preparation year at the university. The results of the study are expected to illuminate the discussions in this area.

REFERENCES

Acat, M.B., Kılıç, A.K., Girmen, P. & Anagün, Ş. S., (2007). The necessity and applicability levels of the courses that are offered in the departments of CEIT, *The Turkish Online Journal of Educational Technology*, 6(3), p.12.

Duatepe, A. & Çilesiz, Ş., (1999). Matematik tutum ölçeği geliştirilmesi, *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi,* 16-17, p.51.

Farooq, M. S. & Shah, S. Z., (2008). Students' attitudes towards mathematics, *Pakistan Economic and Social Review,* 46(1), p.79.

İşlek, H. (2007*). Bilgisayar eğitimi bölümü öğrencilerinin matematiksel alt yapılarının lisans eğitimleri üzerine etkisi*. Yüksek Lisans Tezi, Gazi Üniversitesi/Bilişim Enstitüsü, Ankara. p.37.

Karasar, N. (2000). *Bilimsel Araştırma Yöntemi- Kavramlar, İlkeler, Teknikler*. Nobel Yayınevi. p.77.

Köğce, D., Yıldız, C., Aydın, M. & Altındağ, R., (2009). Examining Elementary School Students' Attitudes towards Mathematics in Terms of Some Variables, *Procedia Social and Behavioral Sciences*, 1, p.294.

Ma, X. (1997). Reciprocal Relationships between Attitudes towards Mathematics and Achievement in Mathematics, *The Journal of Educational Research*, 90(4), p.226, 227.

Rounds, J.B. & Hendel, D., (1980). Mathematics Anxiety and Attitudes toward Mathematics*, Measurement and Evaluation in Guidance,* 13 (2), p.83.

Sırmacı, N. (2007). Üniversite Öğrencilerinin Matematiğe Karşı Kaygı ve Tutumlarının İncelenmesi: Erzurum Örneği, *Eğitim ve Bilim,* 32 (145), p.67, 68.

Şahinkayası,H. & Şahinkayası,Y., (2004). Bilgisayar ve Öğretim Teknolojileri Eğitimi (BÖTE) Bölümü Lisans Programında Bulunan "Öğretim Teknolojileri ve Materyal Geliştirme" Dersinin Analizi. *XIII. Ulusal Eğitim Bilimleri Kurultayı,* İnönü Üniversitesi, Eğitim Fakültesi, Malatya. p.1, retrieved 15.05.2011 from http://www.pegema.net/dosya/dokuman/439.pdf

Tabuk, M. & Özdemir, A. Ş. (2010). Proje Tabanlı Öğrenmede Çoklu Zekâ Yaklaşımının Öğrencilerin Matematiğe Karşı Tutumlarına Etkisi. *E-Journal of New World Sciences Academy*, 5 (3), p.675.

Tezer, M. & Karasel, N. (2010). Attitudes of primary school 2nd and 3rd grade students towards mathematics course, *Procedia Social and Behavioral Sciences,* 2, p.5809.

Tocci, C. M. (1991). Achievement, Parental, Support, and Gender Differences in Attitudes toward Mathematics, *Journal of Educational Research,* 84 (5), p.280.

Uşun, S. & Gökçen, E., (2010). The Effect of Activity Based Instruction Approach on Students' Attitudes towards the Mathematics Lesson in the Second Grade of Primary School. *International Online Journal of Educational Sciences,* 2 (2), p.554.

Yara, P. O. (2009). Student's Attitude towards Mathematics and Academic Achievement in Some Selected Secondary Schools in Southwestern Nigeria, *European Journal of Scientific Research,* 36 (3), p.339.

Yenilmez, K. (2007). İlköğretim Öğrencilerinin Matematik Dersine Yönelik Tutumları, *Ondokuz Mayıs Üniversitesi Eğitim Fakültesi Dergisi,* 23, p.55, 57.

YÖK, (2011). *Bilgisayar ve Öğretim Teknolojileri Eğitimi Lisans Programı*, p.2, retrieved 15.05.2011 from: http://www.yok.gov.tr/component/option,com_docman/task,cat_view/gid,134/Itemid,99999999/