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Investigation of Students' ICT Skills in Terms of Different Variables in a Technical and Vocational High School for Girls

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This study aims to measure girls' technical and vocational high school students' information and communication technology (ICT) skills and to investigate these in terms of different variables. The singular and relational survey model was used in this study. The sample composed of 119 technical and vocational high school students. The data were collected through a paper-based survey composed of two parts. In the first part of the survey, there are 15 items about personal information and demographic information about the participating students. In the second part, there is a scale about ICT skills. The data were analyzed by Statistical Package for Social Sciences (SPSS) Version 21.0 by means of percent, frequency, mean, mode, median, Mann-Whitney *U*, and Kruskall-Wallis test. The results showed that there were no significant differences in the technical and vocational high school students' ICT skills with respect to gender, class level, experience in the use of computers, frequency of using the Internet, working style, learning style, and motivation style. As for the "number of aim using the Internet" variable, a significant difference in the ICT skills scale was observed.

Keywords: information and communications technology (ICT) skills, mobile technology, technical and vocational high school students

Introduction

Information and communication technologies (ICTs) have become a significant moving force in the daily life and economic activities. An overwhelming majority of the residents of Europe currently use computers for various purposes and using computer is an ordinary daily activity especially for the rising generation (European Commission, 2011, p. 9). ICTs have become a field which expands its borders constantly and also increases the number of fields it encompasses every passing day (Çoklar, 2012). As the emerging technological developments have affected all aspects of our lives in general, they have also made an impact on our education system and led to changes in it. The technological developments have become pervasive in all phases of the learning-teaching process and come into use in all phases of education (Kurtoğlu, 2009). Technology-based teaching systems came out with the works for the integration of computers into the field of education. With the widespread use of computers and the Internet in particular, the use of technologies in the ways of reaching information and communication has increased significantly and the concept of ICTs has become increasingly widespread.

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Since the technologies used in reaching information can be used for communication purposes as well, information technology and communication technology were used together and thus, the concept of ICTs ensued (Haznedar, 2012). All kinds of visual, auditory, and written technological tools which ensure a fast flow of information and ideas without time and space constraints are called "ICTs" (Kurtoğlu, 2009). Developments in ICTs affect the components constituting both the society and the education system. Therefore, students and teachers who are components of the education system need to keep up with this change. In this respect, according to Kurtoğlu (2009), the proper use of ICTs by each student and teacher in all classrooms and schools has recently gained prominence.

According to the European Commission (2011, p. 9), all the European states have national strategies designed to promote the use of ICTs in different fields including a specific strategy allocated to education. In many cases, these strategies aim at enabling the students to acquire the essential ICT skills. For helping the students acquire ICT skills, ICT skill levels of the students and the variables influencing the ICT skill levels should primarily be determined. Therefore, the present study aimed at determining the ICT skill levels of the students and the variables affecting the ICT skill levels. This study is of importance since it may guide future studies and arrangements.

The purpose of this study is to determine the ICT skill levels of the students studying at a technical and vocational high school for girls. The present study also aims at examining the impact of various variables, such as demographic features of the students, motivation, frequency of using the Internet, learning method, and way of studying on the ICT skills of the students. To this end, answers were sought for the following three questions:

1. What are the ICT skill levels of the students from the technical and vocational high school for girls?

2. Do the ICT skills of the students of the technical and vocational high school for girls vary significantly by: (a) gender; (b) weekly Internet use; (c) learning methods; (d) way of studying; (e) purpose of using ICTs; (f) type of motivation; and (g) duration of computer use.

3. What are the variables predicting the ICT skills of the students from the technical and vocational high school for girls?

Literature Review

In the literature, ICTs constitute a common area of research. In these studies, self-efficacy and attitude of the students in using ICTs (Papastergiou, 2010; Usluel, 2007; Albirini, 2004; Usta & Korkmaz, 2010; Özdemir, 2010; Demiralay & Karadeniz, 2010), computer literacy levels and skills (Luu & Freeman, 2011), status of using ICTs (Yurdakul, 2011; Birgin, Çoker, & Çatlıoğlu, 2010; Özmusul, 2008; Aypay, 2010), levels of benefiting from ICTs (Özmusul, 2008; Akbaba-Altun, 2006), and competences in ICTs (Cüre & Özdener, 2008; Dinçer & Şahinkayası, 2011; Tasir, Abour, Halim, & Harun, 2012) were observed.

In some studies conducted on teachers, attitude towards ICTs, success in the application of ICTs, integration of ICTs into education, and competences in using computers and ICT skills were examined (Demiraslan & Usluel, 2005; Albirini, 2004; Akbaba-Altun, 2006; Cüre & Özdener, 2008; Özdemir, 2010; Tasir et al., 2012; Usluel, Mumcu, & Demiraslan, 2007; Balkı & Saban, 2009; Sheehy, 2001). Studies on the integration of ICTs in education also exist. The process of integration is ambiguous and multi-dimensional (Usluel & Yıldız, 2012). When the literature is examined, it is seen that the subject was addressed in terms of director, teacher, and school policy (Sang, Valcke, Van Braak, & Tondeur, 2010; Tondeur, Valcke, & Van Braak, 2008; Tondeur, Van Braak, & Valcke, 2007; Usluel et al., 2007; Mishra & Koehler, 2005; Bucci, Copenhaver, Lehman, & O'Brien, 2003;

Boshuizen & Wopereis, 2003); students (Herzig, 2004; Lim & Ching, 2004; Boshuizen & Wopereis, 2003; Cartwright & Hammond, 2003); and curriculum (Vanderlinde & Van Braak, 2011; Vanderlinde, Van Braak, & Hermans, 2009; Vanderlinde, Braak, De Windt, Tondeur, Hermans, & Sinnaeve, 2008).

There are studies where the impact of the use of ICTs on students' achievements in science and their scientific process skills were examined (Huppert, Lomask, & Lazarowitz, 2002; Geban, 1990; Tavukçu, 2008; Rohaida, 2004). At the end of these studies, it was determined that the use of ICTs made a positive impact. Furthermore, numerous studies were conducted in order to determine the status of having ICTs, the levels of benefiting from these technologies, and scientific process skills among primary school students (Balım, Evrekli, İnel, & Deniş, 2009; Özmusul, 2008; Tor & Erden, 2004).

When the relevant studies are considered, only a limited number of studies examining the ICTs in terms of motivation, learning method, and way of studying are available (Haznedar, 2012). Considering the deficiency detected in the literature, it is suggested that examining ICT skills of the individuals comparatively in terms of different variables will be useful and significant.

Method

Research Model

The single screening model was employed in order to reveal the ICT skill levels of the students while the relational screening model was used to examine them in terms of different variables. The single screening model focuses the research on a single variable and examines its situation in a specific moment or its change in a specific period (Karasar, 2007). On the other hand, the relational screening model is generally used in the determination of the interactions among several variables (Şimşek, 2012).

The Survey Instrument

In the research, the survey instrument consists of two parts. The first part includes 15 items in relation to the demographic attributes that will reveal the personal information of the students as well as their status of using ICTs descriptively. The second part, on the other hand, consists of a scale prepared by Haznedar as an up-to-date tool which is more suitable for the conditions of Turkey. Haznedar developed this scale by adapting several items of the scale developed by Wilkinson, Roberts, and While (2010) on the attitudes towards e-learning.

The second part consists of 28 items with the questionnaire on ICT skills of students which aims at revealing the students' perceived skills for using ICTs. For the answers to be given to the items, a 5-point Likert-type rating that is frequently used by the researchers was preferred. Accordingly, the rating is as follows: 1—"Totally disagree", 2—"Disagree", 3—"Unsure", 4—"Agree", and 5—"Totally agree".

"ICT skills" scale has three dimensions which are information technologies, communication technologies, and mobile technologies. The reliability coefficient of this scale is $\alpha = 0.933$. Since the "ICT skills" scale has 28 items, the lowest and highest scores that can be taken from the scale are 28 and 140 respectively (Haznedar, 2012).

Participants

The research was conducted on 119 students studying at a girls' technical and vocational high school. The distribution of the participants by gender is given in Figure 1. While 82 (68.91%) of the participants were female, 37 (31.1%) of them were male.

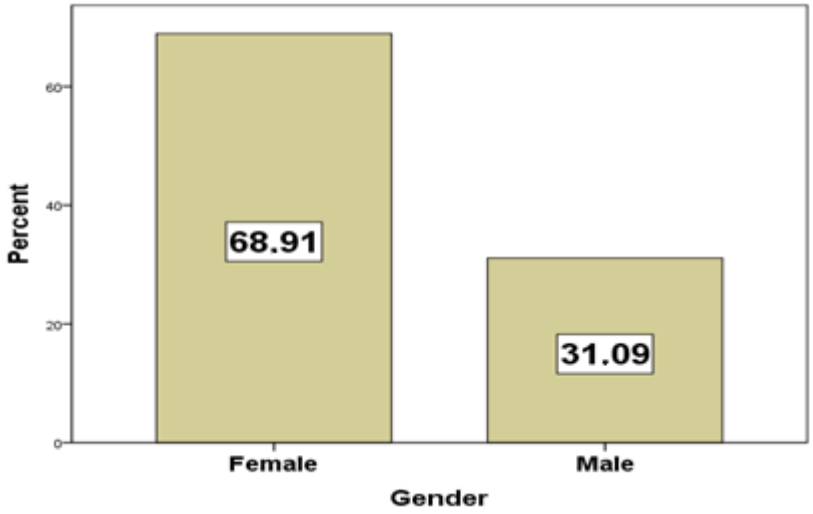

Figure 1. Distribution of the participants by gender.

According to the students' experience in computer use, 6.72% (*N* = 8) of the participants have experience less than one year, 13.45% (*N* = 16) of themhave experience for 1-3 years, 30.25% (*N* = 36) of themhave experience of 4-5 years, 28.57% (*N* = 34) of them have experience for 6-7 years, and 21.01% (*N* = 25) of them have experience for more than 7 years (see Figure 2).

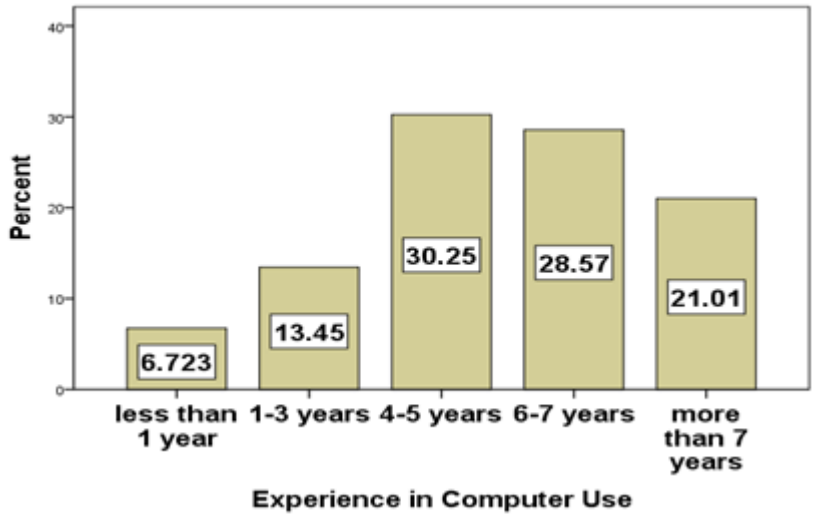

Figure 2. Distribution of the participants by experience in computer use.

Findings

Descriptive Statistics Concerning Demographic Attributes

Within the scope of the demographic attributes of the participating students, the experience of computer use, frequency of using the Internet, purposes of using ICTs, learning method, way of studying, way of learning, and type of motivation were examined. The percentage distributions of the demographic attributes of the participating students were presented in graphs.

According to the data concerning the students' frequency of using the Internet, 47.06% (*N* = 56) of them use the Internet for 0-7 hours a week, 26.05% (*N* = 31) of them use the Internet for 8-21 hours a week, 11.76%

(N = 14) of them use the Internet for 22-35 hours a week, and 15.13% (N = 18) of them use the Internet for more than 36 hours a week (see Figure 3).

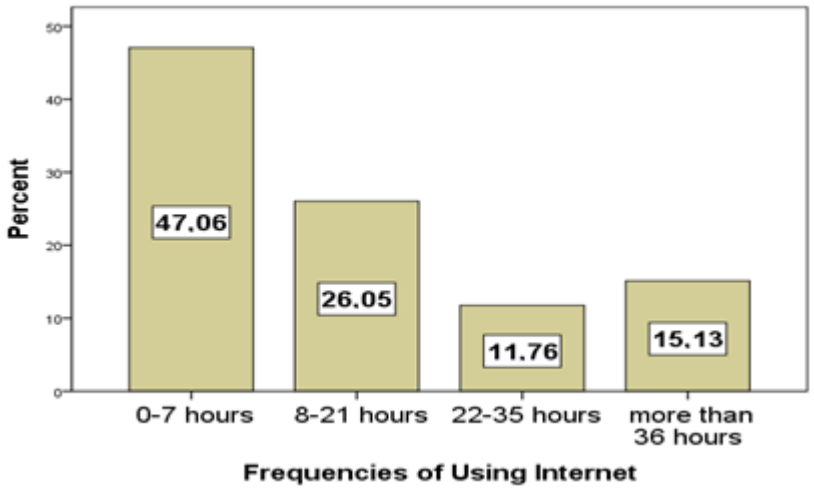

Figure 3. Distribution of the participants' frequencies of using the Internet.

In relation to the purposes of using ICTs, the students marked one or several of such alternatives as making searches as regards to the courses, doing homework, radio-TV-newspaper, film-music-video, shopping, Internet banking, game, communication, social networking, surfing through the Internet, and others. According to the data in Figure 4, 21.01% (N = 25), 56.30% (N = 67), and 22.70% (N = 27) of the participants chose 0-3, 4-6, and 7-11 alternatives respectively, out of 11 alternatives (see Figure 4).

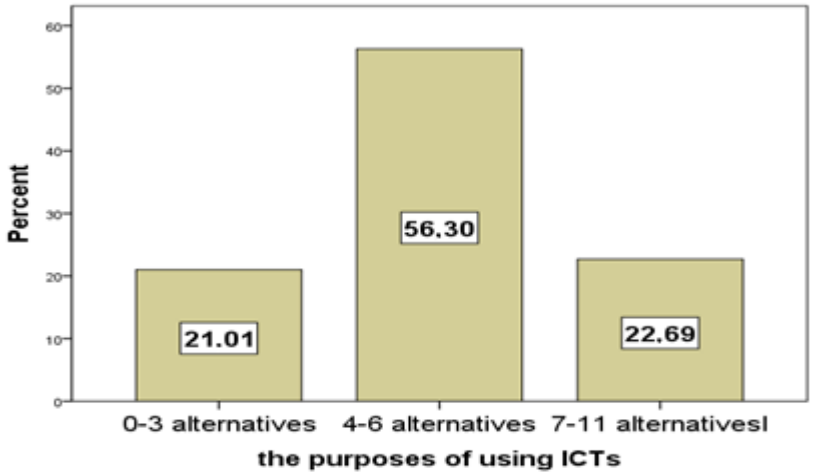

Figure 4. Distribution of the numbers of purposes selected by the participants for the use of ICTs.

As for the participants' purposes of using ICTs, 73.9% (f = 88), 74.8% (f = 89), 28.6% (f = 34), 87.4% (f = 104), 24.4% (f = 29), 2.5% (f = 3), 46.2% (f = 55), 48.7% (f = 58), 73.9% (f = 88), 41.2% (f = 49), and 2.5% (f = 3) of the participants stated that they use the Internet for making searches as regards to the courses, doing homework, radio-TV-newspaper, film-music-video, shopping, Internet banking, games, communication, social networking, surfing through the Internet, and other purposes (see Figure 5). According to the results, ICTs are mostly used for watching films and videos and listening to music while they are used for Internet banking at the least.

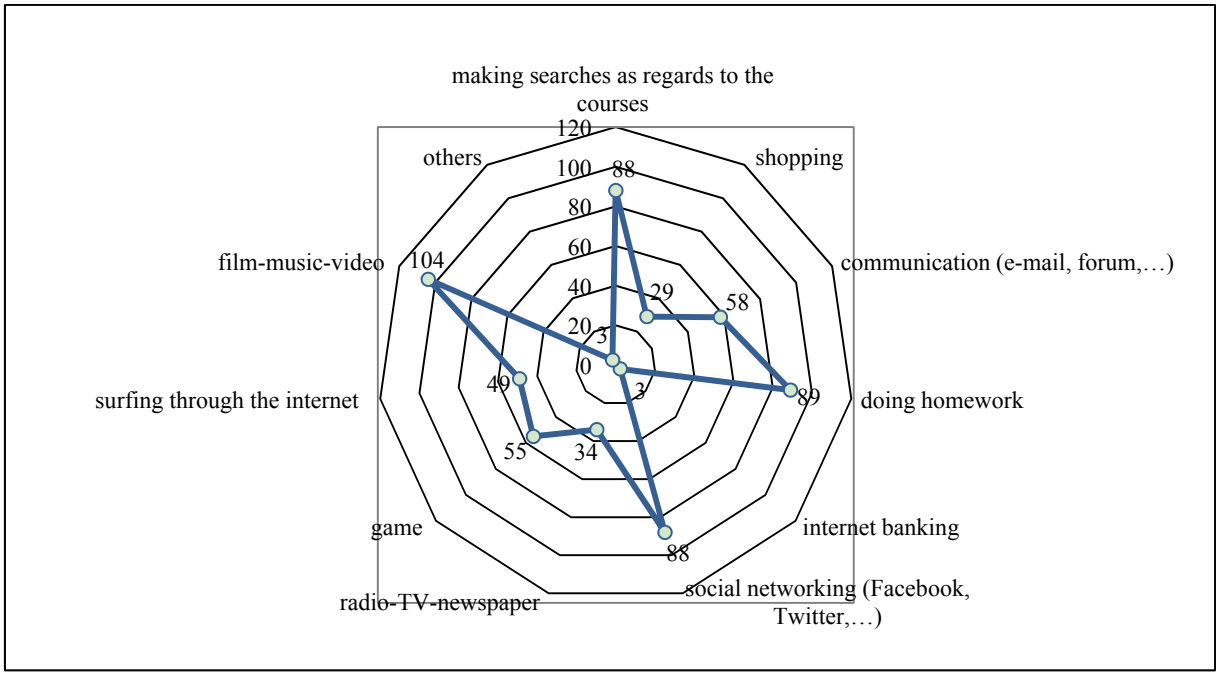

Figure 5. Distribution of the purposes of using ICTs among the participants.

As for the learning methods, 40.34% (*N* = 48) of the students prefer face-to-face education, 47.90% (*N* = 57) prefer mixed education (face-to-face + e-learning), while 11.76% (*N* = 14) prefer e-learning (see Figure 6).

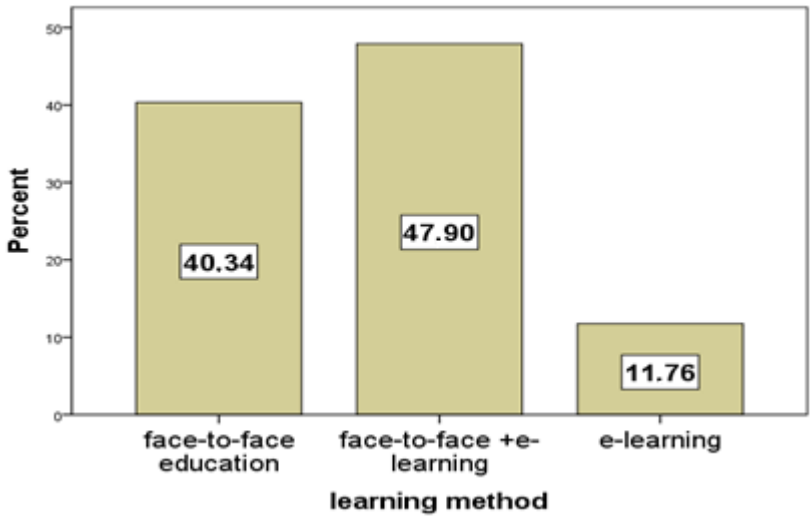

Figure 6. Distribution of the participants by the learning method.

In terms of way of studying, 60.50% (*N* = 72) of the students prefer studying individually while 39.50% (*N* = 47) of them prefer studying in groups (see Figure 7). As for the way of learning, 52.94% (*N* = 63) stated that they better learn with visual aids while 32.77% (*N* = 39) of them found auditory aids more useful and 14.29% (*N* = 17) of them find tactual aids more useful (see Figure 8). As to the types of motivation, 52.94% (*N* = 63) have external motivation while 47.06% (*N* = 56) of them have internal motivation (see Figure 9).

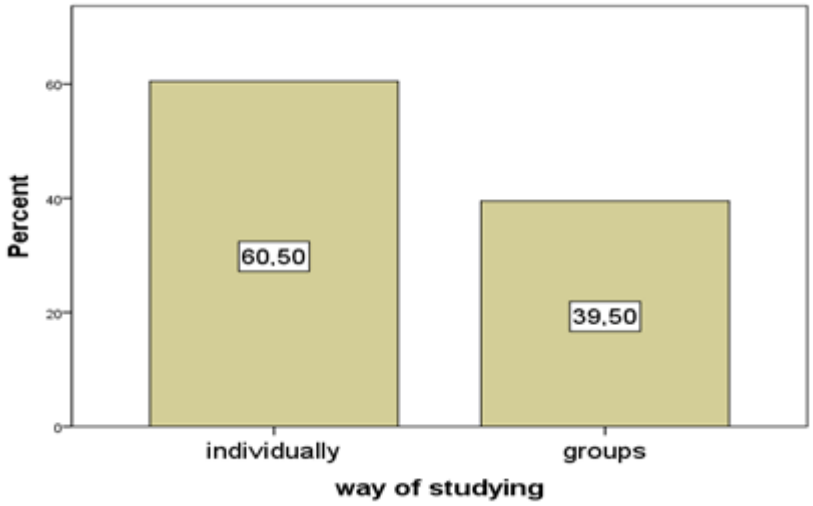

Figure 7. Distribution of the participants by the way of studying.

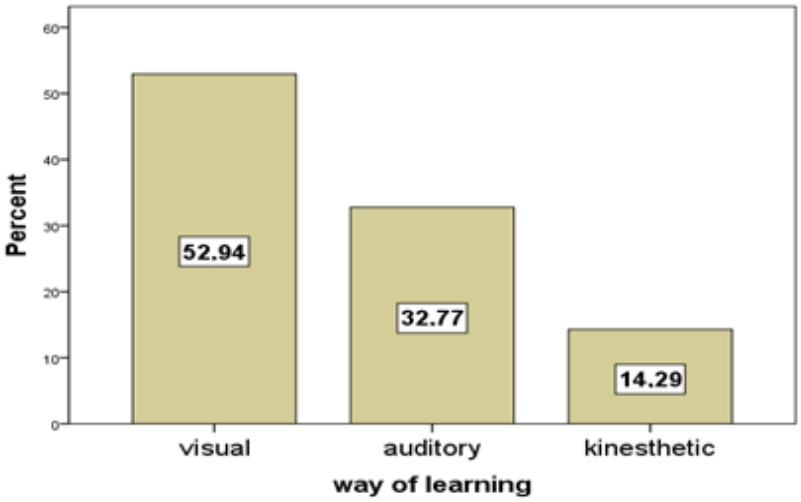

Figure 8. Distribution of the participants by the way of learning.

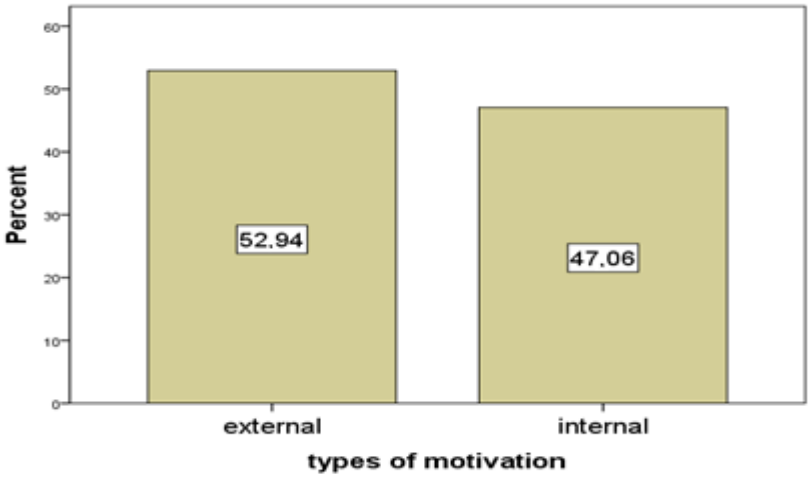

Figure 9. Distribution of the participants by the type of motivation.

Measures of Central Tendency and Variability

The measures of central tendency and variability belonging to the scores of the ICT skills are given in Table 1 while histogram and quantile-quantile (Q-Q) graph displaying the normal distribution are given in Figure 10.

Table 1

Descriptive Statistics of the ICTs

Units	Statistics
Mean	115.40
Median	119
Mod	124
SD	16.69
Skewness and std. error	-0.992222
Kurtosis and std. error	0.945440
Range	79
Minimum	61
Maximum	140

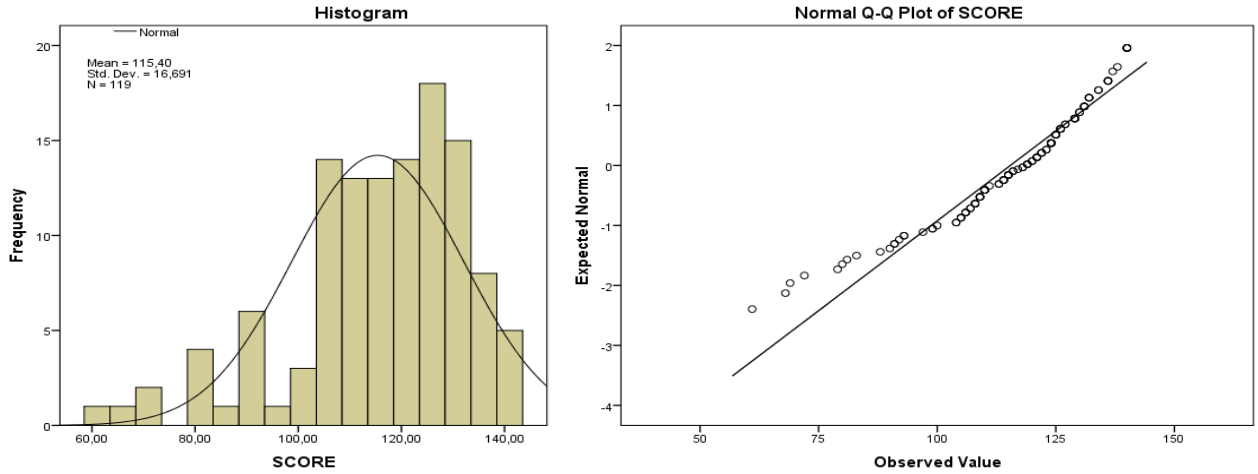

Figure 10. Histogram and Q-Q graph displaying normal distribution.

The lowest and highest scores obtained from the scale of "ICT skills" were 61 and 140 respectively. The mean of the total score was calculated as 115.40. This result shows that the ICTs of the participants correspond to 4.12 at the 5-point Likert-type scale, in other words, skill levels are high.

Analysis of the Data

The numeric data obtained from the data collection tools were coded and computerized through Statistical Package for Social Sciences (SPSS) Version 21.0 and analyses based on sub-problems were made. In the analysis of the demographic attributes, such descriptive statistics as frequency, percentage distribution, and cross tabulation were employed. Results of the analyses were given in tables and interpreted. In order to examine the ICT skills of the students in terms of various independent variables, the Kolmogrov-Smirnov test was applied to determine the tests to be applied and the fitness of the scores to the normality was tested.

When Table 2 is examined, it is seen that the calculated *p* value of the ICT skill scores of the

Kolmogrov-Smirnov test is higher than 0.05. The fact that *p* value calculated in the Kolmogorov-Smirnov test is lower than 0.5, which is interpreted in the way that scores deviate from the normal distribution significantly (excessively) in this significance level (Büyüköztürk, 2002). It is seen in Q-Q graph of the skill scores given in Figure 10 that the points on the 45 degree straight line deviate from the straight line both at extreme and median values. Besides, the coefficient of skewness, which is -0.992 (*SE* = 222) shows that the distribution is negatively skewed. When all the data are considered after all, the interpretation is that ICT skill scores of the students do not display normal distribution. Therefore, Mann-Whitney *U* and Kruskall-Wallis tests, which are nonparametric tests, were employed in order to examine the impact of different variables on the ICT skills. The Mann-Whitney *U* test was used in the comparison of two groups out of independent variables while the Kruskal-Wallis test was employed to compare more than two groups.

Table 2

Normality Test of ICT Skill Scores

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistics	*Df*	Sig.	Statistics	*Df*	Sig.
Skill	0.093	119	0.012	0.933	119	0.000

Note. [a] Lilliefors significance verification.

Differences in ICT Skills Based on Gender

Whether the sub-dimensions and total scores of the scale of "ICT skills" varied by gender were examined and the results were presented in Table 3. When the results of the analysis made on the basis of the gender variable are considered, ICT skills of the students do not vary significantly by gender (U = 1,265.500; p = 0.149; $p > 0.05$). The mean rank of the ICT skills of the female students (56.93) is higher than that of the male students (66.80). However, this difference is not statistically significant.

Table 3

Impact of Gender on the ICT Skills

Variable	Gender	*N*	Mean rank	Total rank	*U*	*p*
Skill	Female	82	56.93	4,668.50	1,265.500	0.149
	Male	37	66.80	2,471.50		
Information technologies	Female	82	56.85	4,662.00	1,259.000	0.138
	Male	37	66.97	2,478.00		
Communication technologies	Female	82	57.38	4,705.00	1,302.000	0.214
	Male	37	65.81	2,435.00		
Mobile technologies	Female	82	60.22	556.50	1,499.000	0.906
	Male	37	65.81	1,154.50		

It was seen that the mean rank of the male students (65.81) was higher than that of the female students (60.22) in the sub-dimension of mobile technologies of the ICT skills but the difference between them was not significant (U = 1,499.000; p = 0.906; $p > 0.05$). As for the sub-dimension of information technologies (U = 1,259.000; p = 0.138; $p > 0.05$), the mean rank of the male students (66.97) was found to be higher than that of the female students (56.85). Likewise, in the sub-dimension of communication technologies (U = 1,302.000; p = 0.214; $p > 0.05$), the mean rank of the male students (65.81) was found to be higher than that of the female students (57.38). These findings can imply that the ICT skills of the students do not differ statistically significantly depending on the variable of gender in the sub-dimensions of information

technologies, communication technologies, and mobile technologies.

As a conclusion, it was accepted that the score averages of the groups did not vary by gender in the ICT skills scale and its sub-dimensions.

Differences in ICT Skills Based on the Experience in Using Computers

Whether the total score and scores obtained from the sub-dimensions of the "ICT skills" scale showed difference by the variable of experience in using computers was studied and the results were given in Table 4. When the results of the analysis concerning the variable of experience of using computers are examined, it is seen that the ICT skills of the participants did not differ significantly by the variable of experience in using computers ($\chi^2(4) = 4.355$; $p > 0.05$). Mean ranks of the students' ICT skills were found to be 41.50, 62.09, 58.00, 67.88, and 57.02 for the students having experience for less than 1 year, 1-3 years, 4-5 years, 6-7 years, and more than 7 years respectively. This finding may imply that the ICT skills of the students do not vary statistically significantly by the variable of experience in using computers. In other words, it was accepted that the score averages of the groups did not differ depending on the experience in using computers.

It was determined that there were no significant differences between the sub-dimension of communication technologies ($\chi^2(4) = 7.983$; $p > 0.05$) and experience in using computers and the sub-dimension of information technologies ($\chi^2(4) = 1.886$; $p > 0.05$) and experience in using computers (see Table 4).

Table 4

Impact of Experience in Using Computers on the ICT Skills

Variable	Experience in using computers	*N*	Mean rank	*SD*	χ^2	*p*
Skill	Less than 1 year	8	41.50	4	4.355	0.360
	1-3 years	16	62.09			
	4-5 years	36	58.00			
	6-7 years	34	67.68			
	More than 7 years	25	57.02			
Mobile technologies	Less than 1 year	8	32.75	4	10.114	0.039
	1-3 years	16	67.41			
	4-5 years	36	57.94			
	6-7 years	34	67.47			
	More than 7 years	25	56.78			
Communication technologies	Less than 1 year	8	37.88	4	7.983	0.092
	1-3 years	16	55.97			
	4-5 years	36	63.36			
	6-7 years	34	69.57			
	More than 7 years	25	51.80			
Information technologies	Less than 1 year	8	50.81	4	1.886	0.757
	1-3 years	16	60.38			
	4-5 years	36	56.58			
	6-7 years	34	65.79			
	More than 7 years	25	59.74			

Mean ranks for the mobile technologies skills were found to be 32.75, 67.41, 57.94, 67.47, and 56.78 for the students having experience in computer use for less than 1 year, 1-3 years, 4-5 years, 6-7 years, and more than 7 years respectively. It was determined that the difference between the mean ranks in the sub-dimension of mobile technologies by the variable of experience in using computers was statistically significant ($\chi^2(4) =$

10.114; $p < 0.05$). As a conclusion, it was accepted that the score averages of the populations varied by the variable of experience in using computers in the sub-dimension of mobile technologies.

Differences in ICT Skills Based on the Frequency of Using the Internet

The results of the analysis concerning the variable of frequency of using internet are given in Table 5. When Table 5 is examined, it is seen that ICT skills of the students do not show significant difference by the frequency of using the Internet ($\chi^2(3) = 2.777$; $p > 0.05$). Mean ranks of ICT skills of the students were determined as 60.27, 58.15, 50.11, and 70.06 for the students using the Internet for 0-7 hours, 8-21 hours, 22-35 hours, and more than 36 hours a week respectively. Besides, according to Table 5, there were no significant differences between the frequency of using the Internet and the sub-dimensions of mobile technologies ($\chi^2(3) = 1.773$; $p > 0.05$), communication technologies ($\chi^2(3) = 5.091$; $p > 0.05$), and information technologies ($\chi^2(3) = 2.770$; $p > 0.05$).

As a conclusion, according to the Kruskal-Wallis test, the independent variable of the frequency of using the Internet had no significant impact on the ICT skills. In other words, it was accepted that the score averages of the populations did not differ by the frequency of using the Internet.

Table 5

Impact of the Frequency of Using the Internet on the ICTs

Variable	Frequency of using the Internet	*N*	Mean rank	*SD*	χ^2	*p*
Skill	0-7 hours in a week	56	60.27	3	2.777	0.427
	8-21 hours in a week	31	58.15			
	22-35 hours in a week	14	50.11			
	More than 36 hours	18	70.06			
Mobile technologies	0-7 hours in a week	56	62.39	3	1.773	0.621
	8-21 hours in a week	31	57.40			
	22-35 hours in a week	14	64.61			
	More than 36 hours	18	53.44			
Communication technologies	0-7 hours in a week	56	59.78	3	5.091	0.165
	8-21 hours in a week	31	52.03			
	22-35 hours in a week	14	59.36			
	More than 36 hours	18	74.92			
Information technologies	0-7 hours in a week	56	59.92	3	2.770	0.428
	8-21 hours in a week	31	59.52			
	22-35 hours in a week	14	49.14			
	More than 36 hours	18	69.53			

Differences of ICT Skills Based on the Type of Motivation

The Mann-Whitney *U* test was applied in order to determine whether the type of motivation of the students affects their ICT skills. The results of the analysis are presented in Table 6.

Mean ranks of the ICT skills of the students' were found to be 56.66 and 63.76 for those having external motivation and internal motivation respectively. The mean rank of those having internal motivation is higher. However, the difference between the average ranks by the type of motivation was not statistically significant ($U = 361.000$; $p = 0.370$; $p > 0.05$). According to Table 6, ICT skills did not show significant difference in the sub-dimensions of information technologies ($U = 1{,}612.000$; $p = 0.418$; $p > 0.05$) and mobile technologies ($U = 1{,}713.500$; $p = 0.758$; $p > 0.05$) while they differed significantly in the sub-dimension of communication

technologies (U =1,362.00; p = 0.031; p < 0.05). As a conclusion, it was accepted that score averages of the population differed in favour of the participants having internal motivation in the sub-dimension of communication technologies of the "ICT skills" scale.

Table 6

Impact of Motivation on the ICT Skills

Variable	Motivation	*N*	Mean rank	Total rank	*U*	*p*
Skill	External	63	56.66	3,569.50	1,553.500	0.262
	Internal	56	63.76	3,570.50		
Information technologies	External	63	57.59	3,628.00	1,612.000	0.418
	Internal	56	62.71	3,512.00		
Communication technologies	External	63	53.63	3,378.50	1,362.500	0.031
	Internal	56	67.17	3,761.50		
Mobile technologies	External	63	59.20	3,729.50	1,713.500	0.758
	Internal	56	60.90	3,410.50		

Differences of ICT Skills Based on the Way of Studying

The Mann-Whitney U test was employed in order to reveal whether the type of motivation, way of studying, and type of high school affected the ICT skills among the students. The results of the analysis are presented in Table 7.

Table 7

Impact of the Way of Studying on the ICT Skills

Variable	Way of studying	*N*	Mean rank	Total rank	*U*	*p*
Skill	Individual	72	56.83	4,092.00	1,464.00	0.215
	Group	47	64.85	3,048.00		
Information technologies	Individual	72	56.60	4,075.00	1,447.00	0.183
	Group	47	65.21	3,065.00		
Communication technologies	Individual	72	57.80	4,161.50	1,533.50	0.386
	Group	47	63.37	2,978.50		
Mobile technologies	Individual	72	57.29	4,125.00	1,497.00	0.224
	Group	47	64.15	3,015.00		

As for the way of studying, it was detected that the mean rank of the participants preferring individual study was higher than that of the participants preferring group study and the difference between them was not significant (U = 389.00; p = 0.727; p > 0.05). When Table 7 is examined, it is seen that the scores do not differ statistically significantly by the way of studying in the sub-dimensions of the ICT skills scale. As a conclusion, it was accepted that the mean scores of the populations did not differ by the variable of way of studying.

Differences in ICT Skills Based on the Way of Learning

The results of the analysis concerning the way of learning are presented in Table 8. According to Table 8, ICT skills of the students do not differ significantly by the way of learning ($\chi^2(2) = 2.292$; $p > 0.05$). Mean ranks of the ICT skills of the participants were found to be 64.50, 55.27, and 54.18 for the students finding visual aids, auditory aids, and tactual/kinaesthetic aids more useful respectively. Besides, according to Table 8, there were no any significant differences between the way of learning and the sub-dimensions of mobile technologies ($\chi^2(2) = 0.771$; $p > 0.05$), communication technologies ($\chi^2(2) = 1.616$; $p > 0.05$), and information

technologies ($\chi^2(2) = 4.477$; $p > 0.05$). As a conclusion, it was accepted that the score averages of the populations did not differ by the way of learning.

Table 8

Impact of the Way of Learning on the ICT Skills

Variable	Way of learning	*N*	Mean rank	*SD*	χ^2	*p*
Skill	Visual	63	64.50	2	2.292	0.318
	Auditory	39	55.27			
	Tactual/kinaesthetic	17	54.18			
Mobile technologies	Visual	63	58.29	2	0.771	0.680
	Auditory	39	63.46			
	Tactual/kinaesthetic	17	58.41			
Communication technologies	Visual	63	58.60	2	1.616	0.446
	Auditory	39	65.14			
	Tactual/kinaesthetic	17	53.38			
Information technologies	Visual	63	66.24	2	4.477	0.107
	Auditory	39	52.05			
	Tactual/kinaesthetic	17	55.12			

Differences in ICT Skills Based on the Learning Method

Whether the ICT skills of the students differed significantly by the learning method was tested through the Kruskal-Wallis test, one of the nonparametric tests. In Table 9, the relevant results are presented. When Table 9 is examined, it is seen that the lowest mean rank (53.63) belongs to the students learning through face-to-face method while the highest mean rank (65.18) belongs to the students learning through mixed education method. This difference is not statistically significant. The ICT skills of the students did not differ significantly by the learning method ($\chi^2(2) = 2.808$; $p > 0.05$).

Table 9

Impact of the Learning Method on the ICT Skills

Variable	Learning method	*N*	Mean rank	*SD*	χ^2	*p*
Skill	Face-to-face	48	53.63	2	2.808	0.246
	Mixed method	57	64.80			
	E-learning	14	62.32			
Mobile technologies	Face-to-face	48	56.20	2	1.427	0.490
	Mixed method	57	63.23			
	E-learning	14	59.89			
Communication technologies	Face-to-face	48	60.34	2	0.598	0.742
	Mixed method	57	61.32			
	E-learning	14	53.46			
Information technologies	Face-to-face	48	53.02	2	3.348	0.200
	Mixed method	57	65.18			
	E-learning	14	62.86			

According to Table 9, there are no significant differences between the learning method and the sub-dimensions of mobile technologies ($\chi^2(2) = 1.427$; $p > 0.05$), communication technologies ($\chi^2(2) = 0.598$; $p > 0.05$), and information technologies ($\chi^2(2) = 3.348$; $p > 0.05$). This finding implied that the ICT skills of the

participants and their scores in the sub-dimensions did not differ by the variable of learning method. As a conclusion, it was accepted that the mean scores of the populations did not differ by the learning method.

Differences in the ICT Skills Based on the Purposes of Using ICTs

The results of the analysis as regards to the variable of the purpose of using ICTs are presented in Table 10. The purposes of using ICTs were grouped into three (0-3, 4-6, and 7-11) by the number of purposes marked by the student for the use of ICTs. When Table 10 is examined, it is seen that the mean ranks of the ICT skills of the students are 48.38, 58.53, and 74.41 for the students selecting 0-3 purposes, 4-6 purposes, and 7-11 purposes respectively. This finding may imply that the ICT skills of the students improve as the number of purposes for using ICTs increases. Also, a significant difference was detected between the ICT skills and the purposes of using ICTs ($\chi^2(2) = 7.676$; $p < 0.05$). According to Table 10, there are significant differences between the purposes of using ICTs and the sub-dimensions of mobile technologies ($\chi^2(2) = 3.852$; $p > 0.05$), communication technologies ($\chi^2(2) = 7.554$; $p < 0.05$), and information technologies ($\chi^2(2) = 8.719$; $p < 0.05$). This finding suggested that the ICT skills of the participants and their scores in the sub-dimensions did not differ by the variable of the purposes of using ICTs. Thus, it was concluded that the mean scores of the populations did not differ by the purposes of using ICTs.

Table 10

Impact of the Purposes of Using ICTs on the ICT Skills

Variable	Number of purposes	*N*	Mean rank	*SD*	χ^2	*p*
Skill	Between 0-3	25	48.38	2	7.676	0.022
	Between 4-6	67	58.53			
	Between 7-11	27	74.41			
Mobile technologies	Between 0-3	25	49.58	2	3.852	0.146
	Between 4-6	67	63.19			
	Between 7-11	27	61.74			
Communication technologies	Between 0-3	25	44.08	2	7.554	0.023
	Between 4-6	67	62.32			
	Between 7-11	27	68.98			
Information technologies	Between 0-3	25	51.72	2	8.719	0.013
	Between 4-6	67	56.28			
	Between 7-11	27	76.91			

Examining the Variables Predicting the ICT Skills

Setting the total score obtained from the ICT skills scale as dependent variable, gender (female and male), experience in using computers (less than 1 year, 1-3 years, 4-5 years, 6-7 years, and more than 7 years), frequency of using computers (0-7 hours a week, 8-21 hours a week, 22-35 hours a week, more than 36 hours a week), number of purposes of using ICTs (between 0-3, 4-6, and 7-11), methods of learning (face-to-face, mixed education, and e-learning), ways of working (individual and group), ways of learning (visual, auditory, and tactual/kinaesthetic), and types of motivation (external and internal) were used as independent variables.

Out of classification techniques, Chi-square Automatic Interaction Detector (CHIAD) analysis finding the interactions and combinations between the variables was used. The tree structure obtained with CHAID analysis is presented in Figure 11. Figure 11 displays the predictor variables affecting the skill predicted and the significance levels of these variables. Accordingly, only the variable of the number of purposes for using ICTs affects the ICT skills ($F_{(2,4142)} = 123.256$; $p < 0.01$). It can be said that gender, experience in using computers,

frequency of using the Internet, learning method, way of studying, way of learning, and type of motivation did not have interpretive roles on the ICT skills.

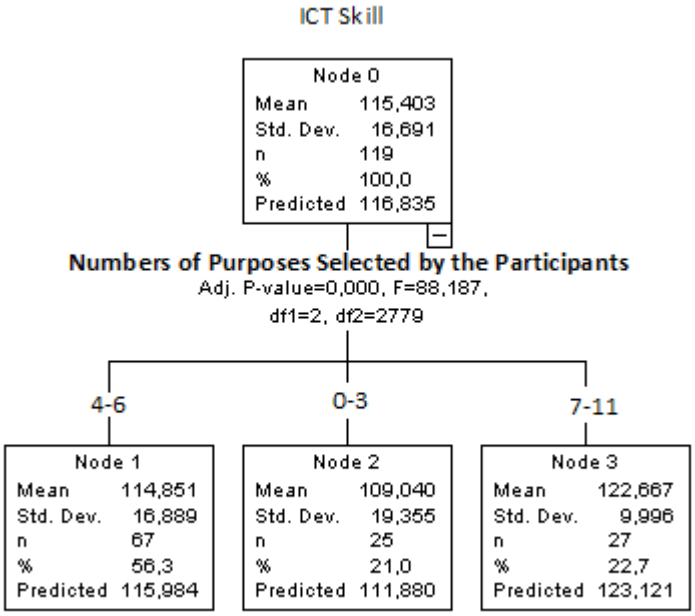

Figure 11. CHAID diagram related to the variables affecting the ICT skills.

Discussion and Conclusion

The results of the analysis of the data obtained in the present study showed that the ICT skills of the students correspond to 4.12 in the 5-point Likert-type scale, in other words, their skill levels are high. This finding shows similarity to some studies conducted on the university students. In the study conducted by Dinçer and Şahinkaya (2011) on the ICT competences of 440 university students, it was determined that 89.01% of the students were highly computer literate. In a research conducted by Haznedar (2012) with the participation of 2,949 university students, the ICT skill levels of the students were examined and it was determined that the ICT skills of the students were 4.2 in the 5-point Likert-type scale, in other words, the skill levels were high.

It was detected that the participants had 4-5 years of experience on average. This finding shows similarity to the results of Şanlı, Abacı, and Sünkür (2012) who conducted a research with 345 primary school students. At the end of the research, it was determined that the primary school Grade II students highly benefited from the ICTs. In the study carried out by Özden and Açıkgül-Fırat (2013) on 487 primary school students, the average of the students' levels of benefiting from the ICTs was found to be 2.73 (out of 4). This average shows that students make use of ICTs sufficiently. However, some studies in the literature revealed conflicting results with the present study. Conducting a research with 72 students in the first year of the science and technology high school, Gürcan (2008) determined that the high school students had been using computers for 3-4 years on average. Examining the statuses of knowing and using computers and the Internet among the 6th, 7th and 8th grade students studying in the primary schools in the city centre of Ankara, Tor and Erden (2004) found out that 14% of the students did not know using computers and the Internet at all, 41.5% of them had limited knowledge, and 44.5% of them had perfect command over computers and the Internet. According to Kanatlı and Schreglman (2012), who tried to detect the levels of benefiting from the ICTs among the 4th, 5th, 6th, 7th,

and 8th grade students in primary schools, 27 of 352 (7.7%) students did not know using computers at all, 153 (43.5%) students had limited knowledge, while 172 (48.8%) students were pretty good at using computers. Özmusul (2008), who conducted a research with 734 secondary grade students, on the other hand, found out that the levels of the secondary grade students of the primary schools from benefiting from the ICTs were low in the sub-dimension of self-expression but moderate in the sub-dimensions of reaching information, research-search, communication, and game entertainment.

It was determined that the variable of gender did not lead to significant differences in the ICT skills of the students from the technical and vocational high school for girls as well as the sub-dimensions. This finding shows similarity to the study of Özmusul (2008), who examined the secondary grade primary school students' levels of benefiting from the ICTs and whether they differed by the social and pedological variables and did not detect a statistically significant difference between gender and the total scores collected in the scale. In the study conducted by Özdemir (2010) with the participation of 496 university personnel, the impact of gender on ICT skills was not found to be significant. This finding reached by Özdemir (2010) also supports the present study.

However, it was found out in the study carried out by Kışla, Arıkan, and Sarsar (2009) with the participation of 157 instructors randomly picked from nine faculties that the frequencies of using ICTs differed by gender. Likewise, Haznedar (2012) determined in the study conducted with the participation of a vast number of university students that male students had better ICT skills compared to female students. Also, it was revealed in some studies concerning the ICT skills that gender was a distinctive variable and led to a significant difference in favour of male students (Taylor, Goede, & Steyn, 2011; Birgin et al., 2010; Aypay, 2010; Tor & Erden, 2004; Tella & Mutula, 2008; Link & Marz, 2006).

There were no significant differences between the ICT skills of the participants and the frequency of using the Internet, purposes for using the ICTs, experience in using computers, way of studying, motivation, and frequency of using the Internet. This was not an expected result. In the literature, there are a limited number of studies examining the impacts of such variables as motivation and way of studying on the ICT skills. In the study conducted by Haznedar (2012) with the participation of 2,959 students studying at the Faculty of Education, Maritime Faculty, Faculty of Science, Faculty of Letters, Faculty of Fine Arts, Faculty of Law, Faculty of Economics and Administrative Sciences, Faculty of Management, Faculty of Engineering, Faculty of Medicine, and Faculty of Nursing, it was concluded that the ICT skills of the students improved as the experience in using computers, frequency of using the Internet, and the number of purposes for using the ICTs increased.

As for the purposes of using ICTs, it was concluded that the ICT skills of the participants improved as the number of purposes for using ICTs increased. This is an expected result and the students can improve themselves in terms of ICT skills by using computers and the Internet. It was concluded in the study conducted by Haznedar (2012) that the ICT skills of the students improved as the duration of using ICTs increased. Examining the relationship between ICTs and scientific literacy, Luu and Freeman (2011) found the scientific literacy levels of the students who were experienced in terms of ICTs, who were using the Internet more frequently, and who had self-confidence in the basic ICT skills, were higher. The finding presented by Luu and Freeman (2011) is compatible with the result of the present study. Likewise, Papastergiou (2010) indicated that the students increased their self-efficacy levels in relation to computers and the Internet and reduced their anxieties stemming from the computer through the course of scientific literacy.

Two recommendations can be made in relation to this study. Firstly, similar studies examining which variables are influential on the levels of ICT skills should be conducted with larger samples consisting of the students from the technical and vocational high school for girls. In line with the results to be obtained, the students will be able to adapt to the education system which has changed with the integration of computers. In the second place, similar studies can be conducted with the other types of high school. The results can be compared and taken as the basis for the development of the national education strategies where ICTs are integrated.

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