EVALUATION OF STUDENT NURSES' USE OF THE INTERNET AND TECHNOLOGY IN EDUCATION AND SELF-EFFICACY PERCEPTIONS OF COMPUTER USE

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ABSTRACT

Background: In today's technology age, where information technology is rapidly improving, the ability to use technology and information effectively is among the competencies that a nurse should have. **Objective:** The research was carried out to determine student nurses' use of the internet, computer, and technology products in education and their self-efficacy perceptions about computer use. **Methods:** This descriptive research was carried out with 548 out of 786 student nurses. The data were collected with a questionnaire including students' demographic characteristics, use of computers and technology products, and a self-efficacy perception scale. **Results:** Students preferred their lessons about the nursing profession primarily in a laboratory environment (44%), at hospitals (24%), in a simulation center (21%), and in a classroom environment (11%). The students' mean self-efficacy perception score was found as 36.83±7.72. In terms of using the computer in everyday life, self-efficacy perception scores of male students, fourth-grade students, those who preferred to have their lessons about the nursing profession in the simulation center, and those who often used mobile applications for educational purposes were found higher than those who were female, first-grade students, those who wanted to have their lessons about the nursing profession in the laboratory, and those who used mobile applications only for several times respectively. **Conclusion:** The self-efficacy level of nursing students regarding computer use was slightly above the middle level, and the self-efficacy level of male and senior students was higher depending on the frequency of being more engaged in technology.

Keywords: Student Nurse, Nursing, Self-Efficacy, Technology, Computer

INTRODUCTION

The developments in science and technology, which cause significant changes in every area in today's world, have a great impact on the changing forms of accessing information and communication. The education system continues to evolve, depending on the rapid advances in technology, knowledge, and thus individuals. Technology has been an important component of education, especially with the proliferation of the internet, computers, and mobile devices (Billsberry & Rollag, 2010; Friesen, 2012) In this context, the education of the new generation, born in the era of technology and interacting with technology in all areas of life, has become integrated with gradually increasing technology. Accordingly, when the relevant training was examined, it was seen that the training given through technological tools compared to the traditional methods enabled the students to listen to the lesson more actively

and to grasp the subject in depth (Kenar, 2012) and enriched the learning environment, created a different educational environment, and increased the individual participation of the students (Kol, 2012).

Background

In higher education, educational technology, which helps students learn more meaningfully and efficiently by addressing many sensory organs in the learning process of the new generation (Metin *et al.*, 2013), is an important element in facilitating teaching and learning (Jarosinski & Heinrich, 2010; Rienties *et al.*, 2013). It has also gained increasing importance in nursing education and has led many nurses to question the learning and teaching models of educators (Lombardi *et al.*, 2013, Kısa & Kaya, 2006). Technology offers nurse educators to constantly increase options that encourage lifelong learning, and also enables nurses and nursing students to learn, share information, and collaborate with colleagues around the world (Novotny & Wyatt, 2006). On the other hand, it is observed that traditional methods, which are frequently used in nursing education today, are not sufficient to meet the changing needs and expectations of today's students, to increase and maintain their motivation (Prensky, 2001). Considering that students should acquire 21st century prominent skills such as scientific, creative and critical thinking, problem-solving skills, taking responsibility for their learning, equal opportunities in teaching, cooperation, and communication (ISTE, 2018), it is an undeniable fact that technology should be integrated into nursing education. Innovative practices that can be an alternative to traditional learning environments in nursing education are expected to support effective, engaging, rapid and permanent learning and to meet changing student needs and expectations (Terzioğlu *et al.*, 2012; Bromberg *et al.*, 2013). Continuous change and development of technology bring along challenges as well as opportunities for nursing education. These challenges are the lack of in-service training, technical support, necessary hardware tools, and basic computer skills (Göktaş *et al.*, 2013). The more nurse trainers use technology in education (Oermann *et al.*, 2017) and the more they structure their educational environment (Fisher & Newton, 2014), the more positive impact they will have on students' learning. Students' self-efficacy of technology use and computer literacy levels are very important for them to access and use many educational contents created by using computers in their educational processes. Accordingly, student nurses and educators must be trained to use technology effectively. Therefore, this study was carried out to evaluate student nurses' use of the internet, computer, and technology products in education and their self-efficacy perceptions about computer use.

METHODOLOGY

Type and Purpose of the Study

This study was carried out in a descriptive design to evaluate student nurses' use of the internet, computer, and technology products in education and their self-efficacy perceptions about computer use.

The Universe and the Sample of the Research

The universe of the study was composed of 786 nursing students studying at a university in Trabzon, and the sample included 548 (69.7%) volunteer students.

Ethical Considerations

To conduct the research, necessary permission was obtained from the relevant institution (63582098/299/) on March 09, 2018, and all student nurses gave their informed consent before their inclusion in the study.

Data Collection Tools and Process

After obtaining consent from the volunteer students and permission from the relevant institution, the personal information form and the self-efficacy perception scale related to the computer use were distributed to the students by the researchers and collected between March 20 and April 14, 2018.

The Personal Information Form: The form was prepared by the researchers in line with the literature (Öztürk *et al.*, 2018; Williamson & Muckle, 2018; Karadağli & Aslı, 2017; Hallila *et al.*, 2014) consists of questions regarding the students' age, gender, marital status, the school they graduated from, and the use of computer technology products.

The Computer Self-Efficacy Scale (CSES): Based on Işıksal & Aşkar (2003), the scale consists of 10 items in total. The five-point Likert-type scale is rated as '1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree, and 5-Strongly Agree'. The highest and the lowest scores on the scale are 50 and 10. Cronbach Alpha coefficients were found to be 0.86 in the study of Işıksal & Aşkar (2003) and 0.84 in this study.

Data Analysis

Number and percentage mean were used to define the

demographic characteristics of the students. Kolmogorov -Smirnov tests were used to determine the status of the normal distribution of data. ANOVA, Kruskal Wallis test, t-test, Mann Whitney-U test was used when comparing the demographic characteristics and scale scores of the students. The results were evaluated at 95% confidence interval and a 5% significance level.

RESULTS

It was found that the mean age of student nurses was 20.3±1.5, 82.8% were female, and 97.3% were Turkish citizens. 75.2% of the students were super/Anatolian high school graduates, 29.9% were first-grade students, and 2.7% of them were citizens of foreign countries. Besides, the academic grade point average of the students was 3.2±0.4.

The reasons for the use of internet by the students were investigated, and the following results were obtained; 82.1% of students used the internet to have fun (listening to music and playing games), 80.3% used it to do research, and 79.4% followed social networking sites. 91% and 49% of them used their mobile phones and computers for educational purposes, respectively. 58% often used mobile applications for educational purposes, while 44% preferred to take the courses related to the nursing profession primarily in a skill laboratory environment. About 92.7% stated that they wished to have lessons using new technological tools, 86.7% wished to follow the courses whenever and wherever they liked, and 53% preferred to follow their courses on the internet (Table 1).

Table 1: Students' daily computer technology use and preferences (N=548)

The Use of Computer Technology	N	%
The use of mobile applications for educational purposes		
I have never used it for educational purposes	25	4.5
I haveused it several times for educational purposes	208	38.0
I often use it for educational purposes	315	57.5
Access tool used for educational purposes*		
Mobile phone	496	90.5
Computer	266	48.5
Tablet	60	10.9

The reasons for the internet use*		
Having fun (listening to music, playing games)	450	82.1
Doing research	440	80.3
Following social networking site	435	79.4
Doing homework	336	61.3
Reading the news	333	60.8
E-mailing	215	39.2
Using it during the lesson	198	36.1
Improving foreign language	119	21.7
Writing	100	18.2
Participating in competitions	69	12.6
Preferences regarding the learning environments for nursing courses		
Nursing Skill Laboratory	240	43.8
Hospitals	133	24.3
Simulation Center	113	20.6
Class	60	10.9
Others	2	0.4
Preferences regarding the lessons *		
Having lessons using new technological tools	508	92.7
Following lessons at any place and time	475	86.7
Following the courses on the internet	291	53.1

n multiple marking.

Students showed 36.83±7.72 in total from the Computer Self-Efficacy Scale (CSES). When the demographic characteristics and scale mean scores of the students were compared, it was seen that male students received higher scores than female students, and 4th-grade students had higher scores than 1st-grade students, which was statistically significant ($p<0.05$). No statistically significant difference was found between scale scores in terms of the students' nationalities and the schools they graduated from ($p>0.05$).

Comparing the students' descriptive features with their scale score averages, the students who used the internet for research, to improve their foreign language, to e-mail, to read the news and to participate in the competitions had statistically significantly higher scores on the scale than who did not ($p<0.05$). The scale scores of the students who used the computer for educational purposes, often used mobile applications for educational purposes, who wished to have lessons about the nursing profession in the simulation centers, who wished to have lessons using new technological tools had higher scores than those who did not use the computer for educational purposes, who used mobile applications for educational purposes only for several times, who wished to have

lessons about the nursing profession in the nursing skill laboratory, and who did not wish to have lessons using new technological tools, respectively ($p<0.05$) (Table 2).

Table 2: Comparison of Descriptive Characteristics of Students with Their Computer Self-Efficacy Scale Scores

Descriptive Characteristics	Total Scale Score	
	Mean ±SD	Tests
Gender		
Female	36.50±7.13	*t*=2.218
Male	38.44±9.99	*p*=0.018
Grade		
1. Grade [a]	35.75±8.658	*F*=2.657
2. Grade [b]	37.21±7.306	*P*=0.048
3. Grade [c]	36.35±7.817	d>a (*P*<0.05)
4. Grade [d]	38.06±6.706	
Nationality		
T.R.	36.83±7.785	U=3845.500
Foreign	36.93±5.133	*P*=0.801
High school		
Vocational School of Health	37.18±6.278	KW=4.792
Normal High School	35.18±7.928	*P*=0.188
Super/Anatolian High School	37.05±7.711	
Others	38.40±8.287	
Access tool used for educational purposes *		
Mobile phone	36.64±7.907	*t*=1.847; *p*=0.065
Computer	38.12±6.471	*t*=3.835; *p*=0.000
Tablet	37.37±7.109	*t*=0.566; *p*=0.572
The use of mobile applications for educational purposes		
I have never used it for educational purposes [e]	36.32±7.680	**KW=16.401**
I have used it several times for educational purposes [f]	35.37±7.197	*P*=0.000
I often use it for educational purposes [g]	37.84±7.920	g>f
The reasons for the internet use*		
Having fun (listening to music, playing games)	36.78±7.778	*t*=0.336 *p*=0.737
Doing research	37.26±7.216	*t*=2.644 *p*=0.008
Following social networking site	37.00±7.722	*t*=0.974 *p*=0.330
Doing homework	37.27±7.381	*t*=1.692 *p*=0.093

Reading the news	37.39±7.161	*t*=3.581 *p*=0.000
E-mailing	38.29±6.596	*t*=3.581 *p*=0.000
Using it during the lesson	36.92±6.839	*t*=0.194 *p*=0.846
Improving foreign language	39.00±7.233	*t*=3.494 *p*=0.000
Writing	37.75±6.895	*t*=1.313 *p*=0.190
Participating in competitions	38.64±8.368	*t*=2.082 *p*=0.038
Preferences regarding the learning environments		
Nursing Skill Laboratory	35.73±7.626	
Hospitals [ı]	37.04±6.947	*F*=3.708
Simulation Center	38.57±6.372	*p*=0.012

t: Independent groups t-test, F: ANOVA, U: Mann Whitney-U test, KW: Kruskal Wallis test

DISCUSSION

In today's world, where information technology is rapidly improving, the ability to use technology and information effectively is among the competencies that a nurse should have. In addition to these skills of future nurses, it is a necessity to improve, develop, and expand the computer use skills. In this context, computer use and computer self-efficacy have become indispensable skills for student nurses to use information effectively in today's technology age. For this reason, determining the computer self-efficacy status and planning appropriate initiatives for the needs during undergraduate education is going to contribute to the training of professional nurses to improve the quality of care in health care services.

In this context, students whose average age was 20 years old, who were mostly female, who were graduates of Super/Anatolian high schools, and whose academic grade average was 3, expressed that almost all of them used their mobile applications for educational purposes, and more than half of them often used mobile applications. However, it was also seen that most of the students used the internet to have fun, do research, and follow social networking sites. As seen, new generation (Z generation) student group, who was born and grew up in a technology-rich environment, spends most of their time with smart phones because internet technologies and digital hardware are defined as an indispensable part of daily life (Aldemir & Akilli, 2015, Somyürek, 2014, Turner, 2015). These students, who constantly interact

with video games, social networks, the internet, or 3D movies in their daily lives, think positively about computer-assisted teaching methods and thus provide positive feedback (Martín-Gutiérrez *et al.*, 2015). According to TUIK's (2019) data, the rate of individuals having mobile phones/smart phones was 98.7%, and the rate of using technologies such as TV, tablet/laptop and game console that can connect to the internet increased gradually. Mobile devices and mobile phones offer serious opportunities in terms of accessing, disseminating, and communicating information. The frequent use of mobile devices and mobile phones also changes the way we live and access education (Franklin & Peng, 2008). Various studies have reported that most of the students prefer mobile learning and mobile technologies in their education (Abu-Al-Aish & Love, 2013; Kıcı, 2010), and they use mobile devices and smart phones to access information, share and access the course materials (Seliaman & Al-Turki, 2012). Also, mobile devices improve learners' ability to use and share information, access information, and problem-solving skills which positively affect their learning motivations (Chen et al., 2008, Özsarı & Saykılı, 2020). The fact that mobile technologies provide users with "anytime and anywhere" learning opportunity enables these applications to be applied more frequently in learning environments (Stockwell, 2008). The differentiation of the student profile and the expected outcomes from education also requires the achievement of training with technological methods and the integration of technology into education. In the study of Williamson *et al.* (2018), almost all of the student nurses stated that the use of technology in training would be beneficial and increase their performance. In parallel with the literature, the results of this study also showed that it is important for student nurses to use computers and similar technologies more effectively and efficiently in their education.

Considering that nurses use health technology very frequently, it is seen that computer technology has a very significant place in care practices because nurses who make evidence-based decisions for professional health care enhance the quality of patient care and reduce the cost by using information/health technologies (Kaya *et al.*, 2008). Therefore, student nurses must use this knowledge and skills very well and be sufficient in this regard. It is an undeniable fact that the need for training of nurses who can make evidence-based decisions using information technologies for professional health care is required. To achieve this goal, first of all, the integration of computer-based technologies into the nursing

education system should be carried out, the student nurses' perceptions about the use of technology should be determined, and their acceptance of technology use in nursing practices should be evaluated (Holden & Karsh, 2010) because it is reported that computer self-efficacy has a positive relationship with learning performance (Chen, 2017).

In this study, the evaluation of students' computer self-efficacy perceptions showed that the scale total score of the students was slightly higher than the middle level. In other words, students' perceptions of computer self-efficacy are positive. Öztürk *et al.* (2018) determined that nursing students' perceptions of computer self-efficacy were moderate and found themselves sufficient. As a result of the studies carried out in nursing schools providing education with computer and computer networks in many countries of the world, it has been observed that nursing students exhibit positive attitudes towards the use of technology (Raman, 2015; Strandell-Laine *et al.*, 2015; Warshawski *et al.*, 2019). Atay *et al.* (2014) also suggested that nursing students had positive attitudes towards computer use in health services. In this study, student nurses' positive computer self-efficacy perceptions may enable them to actively use computer-supported care systems and increase the number of more professional nurses in healthcare.

The expected outcome for generation Z, which can use internet technologies and digital hardware as they wish and defines this hardware as an indispensable part of daily life, is to have good self-efficacy perceptions about computer use (Aldemir & Akilli, 2015; Somyürek, 2014; Turner, 2015). However, in the evaluation of this study in light of this information, it is noteworthy that student nurses' perceptions of computer self-efficacy are not as high as desired. The reason for this may is the inability to fully integrate information technologies into nursing and nursing education, insufficient computer literacy, students' lack of thinking of good computer use as a necessity, their resistance to change, and limited resources such as technological equipment for education.

Self-efficacy studies carried out since the process of providing computer technology education in schools have shown that the competencies of male students are higher than female students (Cooper, 2006). Likewise, in this study, the computer self-efficacy of male students was found higher than female students. Male students showed a more positive attitude towards computers compared to female students (OECD, 2011, Fraillon *et al.*, 2014).

During nursing education, students have used technological tools many times for research and information within the scope of courses. In this study, self-efficacy scores of fourth-grade students were found higher than first-grade students. This finding was similar to studies reported by Tatlı *et al.*, (2018) and Williamson *et al.*, (2018). This may be because first-grade students' lessons are mostly given by nurse educators, or that the number of assignments that first graders usually prepare via computer and internet is fewer than other grades. Some students may be preparing an assignment for the first-time using computer programs because nursing students' families have generally moderate socioeconomic status (Özturk *et al.*, 2020). Since some of the students do not have a computer or android mobile phone, self-efficacy perception levels may be affected. The high level of self-efficacy perception of fourth-grade students may be due to the university's opportunities offered to the students, their ability to use them during the education process, and preparing many nursing courses and clinical practice assignments via computer or internet in the final year.

Computer self-efficacy scores were determined higher in students who often used mobile applications for educational purposes than the others. This situation may have resulted from the fact that their frequent use of computers increased their competence or their preference to use mobile and computer-based technologies frequently developed their related skills. Tatlı *et al.* (2018) also reported that the majority of student nurses preferred both smart phone and a computer to access information.

In this study, the self-efficacy perceptions of students using the internet to do research, develop a foreign language, e-mail, read the news, and participate in competitions were found to be high. This finding is supported by other research results in the literature. For example, 89% of students who attended ICILS 2013 stated that they could use the internet to search and find information (Fraillon *et al.,* 2014). Yardımcı *et al.* (2019) indicated that individuals used the internet because of social media usage, research, and game-play habits. In line with these results, it can be said that the students who use technological tools have a higher level of computer self-efficacy and that their self-efficacy level is more advanced or expected to be more sufficient.

In this study, the students who wished to take their professional courses in the simulation center rather than the laboratory were found to have higher computer self-efficacy perceptions. Besides, almost all of the students preferred to have their education/lessons using new using new technological tools. In other words, students wishing to use technological tools in their education and feeling sufficient in using computers want to have education in technologically equipped simulation centers. Parallel to this study, in the study of Terzioğlu *et al*. (2012), students stated that it would be beneficial to replace the mannequins used in skill practices given in the laboratory and classroom to feel more competent with more developed and responsive mannequins. The use of a simulation technique, which is one of the innovative teaching methods and interactive methods and also an important educational strategy in laboratories, which is the first step in skill acquisition (Robinson & Dearmon, 2013; Durmaz Edeer & Dicle, 2015; Bland *et al.*, 2011). Simulation, which is a technique that provides a real experience of a real environment under the guidance of a supervisor, enables students to act as if they were in a real situation (Gaba, 2007). Within this scope, this preference may arise from the students' awareness of the effectiveness of the simulation method, and the fact that they feel more adequate in this regard, or the instructors can guide the students in a way to support the simulation practices in the lessons. Therefore, these results show that simulation applications should be used more frequently in nursing education.

Limitations of the Research

That the research is conducted only with the views of the student nurses studying at a university is the limitation of the research.

CONCLUSION

Thanks to the widespread use of the internet, computers, and mobile devices, major developments in information production have differentiated the student profile and the outcomes expected from education. In this context, nursing students should have sufficient skills in using computers and technology for academic and professional purposes.

This study, in which student nurses' preferences and computer self-efficacy regarding the use of technology in education was investigated, revealed that the self-efficacy level of nursing students regarding computer use was slightly above the middle level, and the self-efficacy level of male and senior students was higher depending on the frequency of being more engaged in technology. The frequent use of technology and increased awareness,

students who desired to follow lessons in the simulation center of the lessons and who used mobile applications frequently for educational purposes had higher self-efficacy perceptions. Additionally, students who used the internet to do research, to improve their foreign language skills, to send e-mails, to read the news, and to participate in competitions were found to have higher self-efficacy perceptions depending on the willingness to use and discover the internet. In line with these results, it was concluded that considering the preferences of the students, new technology should be integrated into nursing education for the learning success of these students in the Z generation. Nurse educators, who have an important role in training new generation nurses, should also understand the learning needs of this group and encourage them to learn by facilitating their interests and abilities. For this purpose, technological tools should be used to increase the students' experience of using computers, or instead of traditional teaching instruments educators should use technology-based tools, methods and various activities that enable students to use of technology. Thus, nurses who are knowledgeable, experienced, and confident about computer use can be trained. As a result, in the age of rapidly changing and growing information and technology, lifelong learning nurses can take part in health institutions. Thus, the competence of newly trained nurses in their professions can be improved by integrating their knowledge, skills, and critical thinking skills regarding information technologies into the nursing profession.

Conflict of Interests

The authors declare that they have no conflict of interest.

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