HOW ATTITUDES TOWARDS E-LEARNING AFFECTED THE ACADEMIC ACHIEVEMENT DURING THE COVID-19 PANDEMIC: AN EXAMPLE OF A NURSING SKILLS TEACHING

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Received: 21/02/2022 **Accepted:** 09/05/2022

ABSTRACT

It is known that the students' attitudes toward e-learning are an important factor in achieving the targeted learning achievement. The aim of the study was to determine the relationship between attitudes toward e-learning and the academic achievements. This cross-sectional and correlational study was conducted with a total of 135 first-year nursing students. Data were collected via Student Information Form, General Attitudes toward E-Learning Scale, Vital Signs Skills Laboratory Practice Assessment Videos. Two-Way ANOVA, Pearson correlation analysis, multiple linear regression analysis were used to analyze the data. The total mean score of the first-year NSs' general attitude scale toward e-learning was found to be 52.58±15.93. A statistically negative correlation was found between the "avoidance of e-learning" factor and the NSs' vital signs skills general achievement scores (r= -0.185; p= .035). Gender (β1= 5.399, p= 0.001), receiving adequate counseling and help on using the e-learning platform (β1= 4.895, p= 0.022) and avoidance of e-learning (β1= -0.222 p= 0.046) explained 20.9% of the variance in vital signs overall achievement score. The results showed that negative attitudes and negative satisfaction with e-learning may lead to a decrease in e-learning academic achievement.

Keywords: Academic achievement, attitude, emergency remote learning, e-learning, nursing skill education.

INTRODUCTION

Nursing education is a critical component in the preparation of nursing students (NSs) for the profession by having a level of cognitive, affective, psychomotor competence and confidence necessary for them to practice independent nursing roles (McDonald, Boulton & Davis, 2018). This is also a necessary element for achieving safer and better quality patient care results with nurses who have the desired level of competence in nursing practice standards, along with changing health care needs (Chen, Liu & Chao, 2021; Fukada, 2018; Nashwan, Mohamed & Kelly, 2020).

The rising number of cases of COVID-19, which first appeared in Wuhan, China in December 2019 and soon affected the whole world, has led to many negative consequences, such as economic problems, isolation in social life and especially healthcare-related processes (Elbogen, Lanier, Blakey, Wagner & Tsai, 2021; Moradi, Mollazadeh, Karimi, Hosseingholipour & Baghaei, 2021). One of the areas where the alarming effects of the pandemic have been observed and have disrupted the most is the education process (Kutah, 2021). As a global public health problem, many educational institutions have been closed due to the measures taken by governments to control the spread of COVID-19 and the transition was done quickly for the education to be carried out online (Lovri´c, Farci´c, Miksi´c & Vcev, 2020). Similar to the rest of the world, following the detection of the first case of COVID-19 in Turkiye, it was decided to suspend education also in higher education as of March 16, 2020 (Council of Higher Education, 2020). NSs are one of the groups that have been most affected by the impact of the COVID-19 pandemic on their education process (Michel et al., 2021). In nursing education, where theoretical and clinical education forms very important elements by complementing each other, the use of online teaching methods, which has been considered a supportive element until now, has become a necessity rather than an option (Nashwan et al., 2020; Park, Moon & Oh, 2022).

E-learning is a concept within distance education. Distance education is an institutional training activity in which learners, teachers, and teaching materials in different places are brought together through information and communication technologies in cases where it is not possible to implement physical classroom teaching (Cevik & Bakiogli, 2021). The concept of e-learning is a learning method that can is an interaction with the visual and auditory responses provided by computer technology, which is realized by the individual learning by himself and at his own pace over the internet/intranet or a computer network, there is no time and place limitation in accessing information, and which connects the learners and the teacher with synchronous or asynchronous methods (Harerimana & Mtshali, 2021; Logan, Johnson & Worsham, 2021). E-learning can also be defined as the use of information and communication technologies to improve web-based, computer-assisted, digital or online learning (Kim and Park, 2021). Given the contributions of technology to our lives nowadays, e-learning has become an important tool that is of great interest globally, including the academic learning process of students (Suliman, Abu-Moghli, Khalaf, Zumot & Nabolsi, 2021). While e-learning offers learners the opportunity to support the development of their independent skills at an effective and individual learning pace, with repetitions appropriate to their needs, it also provides contributions for educators, such as conducting the course at any time and in any environment, sharing the educational materials updated in line with the needs quickly with the learners, and using different educational technologies (Javadi-Pashaki, Ghazanfari & Karkhah, 2021; Logan et al., 2021; Singh et al., 2021; Urstad et al., 2021).

Given the negative results that may be encountered related to patient safety, effective teaching of basic nursing skills and the ability of students to apply these skills in patient care is one of the critical priorities in nursing education. In this context, the fundamentals of nursing course is a basic course in which students learn and experience the practice of basic nursing skills in patient care for the first time (Sheikhaboumasoudi, Bagheri, Hosseini, Ashouri & Elahi, 2018). Furthermore, the use of teaching methods that not only facilitate students' level of learning basic skills but also make learning permanent is an important consideration in the teaching of the fundamentals of nursing course (McCutcheon, Lohan, Traynor & Martin, 2015). It is a well-known fact that the supportive use of e-learning, together with theoretical and practical education, contributes positively to the teaching of nursing skills (Keefe &Wharrad, 2012; Sheikhaboumasoudi et al., 2018; Voutilainen et al., 2017). However, during the pandemic when face-to-face education was not possible, e-learning was the only element ensuring the continuity of nursing education. This also brought up many concerns such as the failure to achieve the targeted learning outcomes, especially at the point of teaching basic nursing skills due to the interruption of laboratory and clinical practice training for both nursing educators and nursing students, the inability to provide interaction between students and instructors and the inadequacy of students' access to e-learning technologies (Ard, Beasley, Nunn-Ellison & Farmer, 2021; Kalanlar, 2022; Michel et al., 2021; Suliman et al., 2021; Terzi et al., 2021).

With the increasing use of e-learning technologies during the pandemic, another point that studies in the literature have drawn attention to is that either positive or negative perceptions and attitudes of learners toward e-learning are an important factor in achieving the targeted learning achievement (Cevik & Bakiogli, 2021; Guillasper, Soriano & Oducado, 2020; Park, Lee & Bae, 2010; Kim, Hong & Song, 2019). In a study,

indicated that NSs' expectations play a role in their readiness for online learning (Oducado & Estoque, 2021). Although there are various studies examining the attitudes of NSs toward e-learning both internationally (Oducado & Soriano, 2021; Olum et al., 2020; Thapa, Bhandar & Pathak, 2021) and nationally (Keskin & Kurtgoz, 2020; Ozdemir & Sonmez, 2020; Terzi et al., 2021) the number of studies focusing on how attitudes toward e-learning affect the academic achievements of NSs during the pandemic is limited. This study, planned based on this need, is thought to contribute to the limited literature on the subject and will provide guidance to nursing educators in the planning of efficient and effective use of e-learning.

PURPOSE OF THE STUDY

This study was carried out to determine the characteristics and attitudes of first-year NSs, who have experienced the learning of basic nursing skills through distance learning, toward e-learning, and to examine the relationship between NSs' attitudes toward e-learning and the achievement of learning the skill, through the example of vital signs skills teaching.

METHOD

This cross-sectional and correlational design study was carried out in the Nursing Department of a Health Sciences Faculty in the Aegean Region between 15.03.2021 and 15.06.2021.

Participants

The sample of the study consisted of 130 first-year NSs, out of 135 first-year NSs enrolling in the fundamentals of nursing course in the above-mentioned educational institution in the 2020-2021 academic year, who attended the online course conducted synchronously, submitted the vital signs skill practice video recordings requested for the laboratory practice assessment of the course at the end of the term, answered the questions fully in the online survey link shared with the students, and volunteered to participate in the study. The minimum sample size in the study was calculated as 101 among 135 first-year NSs with a 0.05 margin of error, according to the $n= Nt^2pq/d^2(N-1)+t^2pq$ formula (Basturk & Tastepe 2013), which is used when the number of individuals in the population is known. The NSs to be sampled were invited to study by using a simple random sampling method. The participation rate in the study was 96.2%.

Data Collection and Analysis

Student Information Form, General Attitudes toward E-Learning Scale, Vital Signs Skills Laboratory Practice Assessment Videos, Vital Signs Skills Assessment Checklist were used to obtain study data. While the data from the Student Information Form and the General Attitudes toward E-Learning Scale were collected with the online questionnaire created using the Google forms, data on the achievement scores of first year NSs on vital signs skills were obtained from the scores that observers gave on skill practice videos prepared by the NSs.

Student Information Form

This form includes a total of 15 questions, prepared by the researchers based on the literature review (Chan et al., 2021; Ozdemir & Sonmez, 2020; Park et al., 2022; Sasmal & Roy, 2021), which aim to determine the individual (6 questions) and e-learning related characteristics (9 questions) of the first-year NSs participating in the study.

General Attitudes toward E-Learning Scale

The General Attitudes toward E-Learning Scale was developed by Wilkinson, Roberts & While in 2010 to determine students' attitudes toward e-learning. The validity and reliability study of the scale in Turkish was

conducted by Haznedar and Baran in 2012. The General Attitudes toward E-Learning Scale is a 5-point Likert-type scale consisting of a total of 20 items scored as "Strongly Disagree" (1) and "Strongly Agree" (5). The scale can be used as one factor in the form of the general attitude toward e-learning, as well as two-factor in the form of "tendency to e-learning" and "avoidance of e-learning". Ten items (2, 3, 4, 8, 10, 11, 13, 14, 18, 19) under the avoidance of e-learning factor are reverse scored. While the score range that can be obtained from the scale is between 20-100, the high score obtained from the scale is interpreted as a positive attitude toward e-learning (Haznedar & Baran, 2012). The Cronbach's alpha coefficient was found as 0.93 by Haznedar and Baran (2012) in the validity and reliability study of the scale. In this study, Cronbach's alpha coefficient was found to be 0.85 for the General Attitudes toward E-Learning Scale.

Vital Signs Skills Laboratory Practice Assessment Videos

It constitutes a part of the practices that are requested to be submitted at the end of the semester for the laboratory practices assessment of the course from the NSs who took the fundamentals of nursing course online synchronously in the 2020-2021 academic year. Students were asked to practice their radial pulse assessment-respiration assessment, apical pulse assessment, arterial blood pressure measurement skills as per the steps in the skills checklist sent to them as part of the Vital Signs Skills Laboratory Practice Assessment Videos. Within the scope of this study, video recordings related to vital signs skills were used for the assessment of the achievement of first-year NSs in self-learning and applying the skill. Theoretical teaching of these skills, which were requested from the students for laboratory practice assessment, was given online synchronously by the responsible lecturer of the course during the distance education process. For the laboratory practice of the skill, demonstration videos of the skill were prepared by the responsible lecturer of the course to show how to perform each skill as per the steps in the checklist. These video recordings were shared with NSs in order to reinforce the learning of the relevant skill through e-learning and to allow students to watch the skill repeatedly. At the end of the term, NSs were requested to prepare video recordings of how they applied the same skills as per the steps in the skills checklist sent to them, and share these video recordings via the YouTube link by giving access only to the course instructors and the student who sent the video. After the assessment of Vital Signs Skills through the video recordings of the Laboratory Practice, online feedback sessions were held with the NSs.

Vital Signs Skills Assessment Checklist

It includes the steps of the process aimed at the NSs' correct application of radial pulse assessment-respiration assessment (20 items), apical pulse assessment (23 items), arterial blood pressure measurement (32 items) skills, which are prepared as per the expected learning outcomes related to the teaching of vital signs skills. The video recordings prepared and sent by the NSs were assessed by two independent lecturers, who were experts in the field of fundamentals of nursing, per the steps in the Vital Signs Skills Assessment Checklist. When each step specified in the steps related to the skill in the Checklist is performed correctly by the student, it is scored as "1" point, and when not, as "0" point, and for each skill, an achievement score was obtained for each student out of 100 points. The general achievement scores of vital signs skills were calculated by taking the mean of the achievement scores obtained by NSs regarding these skills. Cohen's kappa coefficient related to reliability among the observers who assessed the videos was calculated as 0.87.

All statistical analyses of the data obtained in the study were performed with the SPSS version 22.0 (Armonk, NY: IBM Corp) package program. Categorical data were shown as numbers and percentages, while continuous variables data as mean and standard deviation. The main effects of NSs' characteristics on their vital signs skills general achievement scores were analyzed with Two-Way ANOVA. Pearson correlation analysis was used to analyze the relationship between NSs' attitudes toward e-learning and their vital signs skills general achievement scores. A multiple linear regression model was used to determine the predictors of NSs' vital signs skills general achievement scores. Before multiple linear regression was performed, the assumptions of normality, covariance and multicollinearity were confirmed. $P<0.05$ was considered for the level of statistical significance in all analyses.

Ethical Considerations

Written permission (2021-E.23663) from the Faculty of Health Sciences administration, where the research was carried out, and the ethical approval (2021/380) from the Non-Interventional Clinical Research Ethics Committee of the relevant university were obtained. Also, on the first page of the online survey link shared with the NSs invited to the study, the purpose of the study was explained and it was stated that the participation was voluntary. After the consent of the students, who prepared the videos, were obtained on the fact that the video recordings prepared by them could be accessed only by the lecturers in charge of the course and the NSs to whom the video belongs, privacy settings were applied for video access.

FINDINGS

Characteristics of the First-Year NSs

The mean age of the NSs participating in the study was 19.60±1.24 years, 82.3% of them were female, and 73.8% of them were graduates of Anatolian high school. While only 59.2% of the NSs had a computer of their own, 30.8% of the NSs were found to have a weekly internet usage time of 21 hours or more (Table 1).

Table 1. Characteristics of the First-year Nursing Students (N= 130)

Characteristics	Mean±SD	
Age (Year)	19.60±1.24	
Gender	n	%
Female	107	82.3
Male	23	17.7
Type of Graduated High School		
Vocational School of Health Services	18	13.8
Regular High School	5	3.8
Anatolian High School	96	73.8
Science High School	11	8.5
Having a smartphone of their own		
Yes	130	100.0
No	-	-
Having a computer of their own		
Yes	77	59.2
No	53	40.8
Weekly internet usage time		
1-5 hours	15	11.5
6-10 hours	27	20.8
11-15 hours	26	20.0
16-20 hours	22	16.9
21 hours or more	40	30.8

Characteristics Related to E-lLearning of the First-Year NSs

While 71.5% of the NSs did not have e-learning experience and 31.5% did not have unlimited internet access, more than half of them (56.2%) were found to have difficulty in accessing the internet and 44.6% in using the technological infrastructure. The majority of the NSs (92.3%) stated that they thought that they were able to get enough counseling on using the e-learning platform. More than half of the NSs (52.3 %) reported that they prefer only face-to-face classes for nursing skills teaching. Furthermore, 83.1% of them stated that skill teaching videos and laboratory practice assessment videos, requested from them, contributed to their understanding and learning of the skills (Table 2).

Table 2. Characteristics related to E-learning of the First-year Nursing Students (N= 130)

Characteristics	n	%
Experience with e-learning		
Yes	37	28.5
No	93	71.5
Tools used to access e-learning		
With their own mobile phone	54	41.5
With their own laptop/desktop	66	50.8
With someone else's mobile phone	2	1.5
With someone else's laptop/desktop	8	6.2
Having unlimited internet during the distance education		
Yes	89	68.5
No	41	31.5
Having difficulties with internet access during the distance education		
Yes	73	56.2
No	57	43.8
Having difficulties using the technological infrastructure in the e-learning platform		
Yes	58	44.6
No	72	55.4
Receiving adequate counseling and help on using the e-learning platform		
Yes	120	92.3
No	10	7.7
Preferred learning method		
Both face-to-face classroom lessons and e-learning	74	56.9
Only face-to-face class lessons	50	38.5
Only e-learning	6	4.6
The preferred learning method for learning nursing skills		
Both classroom lessons and e-learning	59	45.4
Only classroom lessons	68	52.3
Only e-learning	3	2.3
The contribution of skill teaching videos and laboratory practice assessment videos, which are used in teaching nursing skills, to understanding and learning the skill		
Yes	108	83.1
No	23	17.0

First-Year NSs' Attitudes toward E-Learning

The total mean score of the NSs' general attitude scale toward e-learning was found to be 52.58±15.93. When the mean attitude score of the students of the sub-factors of the scale was examined, the mean scores of the tendency to e-learning and avoidance of e-learning factors were 25.60±8.77 and 26.98±7.90, respectively.

First-Year NSs' Vital Signs Skills Achievement Scores

The achievement scores of the vital signs skills of the NSs, which were obtained from the assessment of two independent observers, were found to be 89.78±8.65, 89.69±6.09, and 87.28±7.25 respectively for radial pulse assessment-respiration assessment, apical pulse assessment, and arterial blood pressure measurement. The mean general achievement score of the NSs regarding these skills was 88.92±6.55. When the results of the two-way ANOVA analysis conducted to determine the main effects on the NSs' vital signs skills general achievement scores were examined, only the main effects of "gender" and "receiving adequate counseling and help on using the e-learning platform" were significant on achievement scores (p= 0.007; p= 0.047, Table

3, respectively). Accordingly, when female students (89.91±0.54) were compared with males (84.29±1.77), it was found that students who stated that they could get adequate counseling and help (89.36±0.56) were found to have significantly higher overall achievement scores than those who stated that they could not (83.15±2.97). On the other hand, other characteristics of the students did not significantly affect the general achievement scores of vital signs skills (p>0.05; Table 3).

Table 3. Comparison of First-year Nursing Students Vital Signs Skills Achievement Scores according to their characteristics (N= 130)

	Sums of squares	df	mean square	F	p*	partial eta square (ηp2)
Gender	257.628	1	257.628	7.704	0.007	0.072
Type of graduated high school	129.394	3	43.131	1.290	0.282	0.038
Weekly internet usage time	174.797	4	43.699	1.307	0.273	0.050
Having unlimited internet during the distance education	11.932	1	11.932	0.357	0.552	0.004
Having difficulties with internet access during the distance education	0.181	1	0.181	0.005	0.941	0.000
E-learning Experience	0.840	1	0.840	0.025	0.874	0.000
Having difficulties in accessing course materials in the e-learning platform	23.484	1	23.484	0.702	0.404	0.007
Having difficulties in using the technological infrastructure to prepare, upload and send assignments in the e-learning platform	27.591	1	27.591	0.825	0.366	0.008
Receiving adequate counseling and help on using the e-learning platform	210.486	2	105.243	3.147	0.047	0.060
Error	3310.643	99	33.441			
Total	1033314.778	130				

Note. R Squared = 0.403 (Adjusted R Squared = 0.222) *p<0.05 Two-way ANOVA.

Correlation Between First-Year NSs' Attitudes toward E-Learning and Vital Signs Skills Achievement Scores

There was no significant correlation between NSs' general attitudes toward e-learning and their vital signs skills general achievement scores (r= 0.135; p= 0.126). In the relational analysis for the sub-factors of the scale, while no significant correlation was found for the "tendency to e-learning" factor (r= 0.104; p= 0.239), there was a weak negative significant correlation between the "avoidance of e-learning" factor and the NSs' vital signs skills general achievement scores (r= 0.185; p= 0.035).

Predictors of Vital Signs Skills Achievement Scores

The regression model created with the independent variables included in the model was found to be statistically significant (F= 3.130, p<0.001) and these variables explained 20.9% of the model. According to the results of the multiple linear regression analysis, while "gender", "receiving adequate counseling and help on using the e-learning platform", which were accepted as dependent variables on the vital signs skills of NSs, and "avoidance of e-learning" factor were found to be statistically significant explanatory variables (β1= 5.399 p= 0.001; β1=4.895 p= 0.022; β1= -0.222 p= 0.046 respectively), other variables in the model did not have a predictive effect (p>0.05; Table 4). According to the findings, while the female gender contributed to an increase of 5.399 in the vital signs overall achievement score, there was an increase of 4.895 in the general achievement score of the NSs who stated that they could receive adequate counseling and help on using the e-learning platform. A one-unit increase in "avoidance of e-learning score, another significant variable in the model, was found to result in a 0.222 decrease in the general achievement scores of NSs' vital signs skills (Table 4).

Table 4. Predictors of First-Year Nursing Students' Vital Signs Skills Achievement Scores (N= 130)

Enter Method	β1 (95% CI)	SE	β2	t	p	95% Confidence Interval		Zero	Partial	Part	VIF
						Lower	Upper				
(Constant)	77.355	3.360		23.021	0.000	70.699	84.010				
Gender	5.399	1.526	0.316	3.539	0.001	2.378	8.421	0.328	0.312	0.281	1.259
Type of graduated high school											
Regular High School	-4.796	3.331	-0.141	-1.440	0.153	-11.396	1.804	-0.328	-0.134	-0.113	0.637
Anatolian High School	2.416	1.629	0.163	1.484	0.141	-0.810	5.643	0.215	0.138	0.116	0.510
Science High School	2.321	2.341	0.099	0.991	0.324	-2.318	6.960	0.046	0.093	0.078	0.616
Weekly internet usage time											
6-10 hours	-0.039	2.038	-0.002	-0.019	0.985	-4.078	3.999	-0.186	-0.0002	-0.002	0.382
11-15 hours	0.632	1.996	0.039	0.317	0.752	-3.322	4.587	0.002	0.030	0.025	0.410
16-20 hours	3.524	2.019	0.202	1.746	0.084	-0.476	7.525	0.156	0.162	0.137	0.456
21 hours or more	0.616	1.895	0.044	0.325	0.746	-3.137	4.370	0.065	0.031	0.025	0.342
Those who have unlimited internet during the distance education	1.245	1.431	0.089	0.870	0.386	-1.589	4.080	0.223	0.082	0.068	0.591
Those who do not experience difficulties with internet access during the distance education	0.208	1.229	0,016	0,169	0.866	-2.226	2.642	0,167	0,016	0,013	0.703
Those who do not have difficulties in using the technological infrastructure in the e-learning platform	0.196	1.228	0.015	0.160	0.874	-2.236	2.628	0.136	0.015	0.012	0.702
Those who could receive adequate counseling and help on using the e-learning platform	4.895	2.110	0.200	2.321	0.022	0.716	9.075	0.238	0.213	0.182	0.827
Those with E-learning Experience	-0.075	1.249	-0.005	-0.060	0.952	-2.549	2.398	0.072	-0.006	-0.005	0.823
Avoidance of e-learning	-0.222	0.110	-0.298	-2.016	0.046	-0.440	-0.004	0.012	-0.183	-0.161	-0.222

F= 3.130; p<0.001; Adj.R2= 0.209; SEE= 5.829; Durbin-Watson= 2.118 β1 Unstandardized beta coefficients; β2 Standardized beta coefficients

Note. The categorical variables in the model were coded as follows: Female= 1, Male= 0 for gender; Vocational School of Health Services=0, Regular High School=1, Anatolian High School= 1, Science High School= 1 for the type of graduated high school; 1-5 hours= 0, 6-10 hours= 1; 11-15 hours=1; 16-20 hours= 1; 21 hours or more= 1 for the weekly internet usage time; Yes= 1; No= 0 for having unlimited internet during the distance education; Yes= 1; No= 0 for having difficulties with internet access during the distance education; Yes= 0; No= 1 for having difficulties in using the technological infrastructure in the e-learning platform; Yes= 1; No= 0 for receiving adequate counseling and help on using the e-learning platform; and Yes= 1; No= 0 for having e-learning experience.

DISCUSSIONS AND CONCLUSION

It is a known fact that e-learning enhances learning experiences by promoting communication and collaboration between educators and learners. However, evaluating the reflections of e-learning on nursing education, used as a compulsory and only option due to the pandemic conditions, is important in terms of ensuring the correct and effective integration of web-based learning technologies, which is believed to form an important part of the education-teaching process in the near future, into the nursing education curriculum. In this study, we aimed to evaluate the effects of e-learning characteristics and attitudes of first-year NSs on their success in distance learning, through a skills teaching model.

Although e-learning paves the way for students to access the educational environment and materials with their peers during the pandemic, the fact that the use of this technology, in providing online communication, requires features such as internet access and technological infrastructure has brought many challenges especially for students (Divya & Binil, 2021; Kutah, 2021; Suliman et al., 2021). In nursing education, e-learning success has been reported to be associated with the adequacy of available resources and the ability of both students and educators to use information and communication tools (Harerimana & Mtshali, 2021; Divya & Binil, 2021). However, the results of both international (Gharehbagh, Seifi & Moeini, 2021; Kutah, 2021; Subedi, Nayaju, Subedi, Shah, & Mathias, 2020; Suliman et al., 2021; Thapa et al., 2021; Yekefallah, Namdar, Panahi & Dehghankar, 2021) and national (Eren, Korkmaz, Yildirim & Avci, 2021; Terke & Yamac, 2021) studies indicated that infrastructure and technology-related issues constitute a significant part of the negative experiences encountered in the e-learning process. In this study also, NSs were observed to have issues related to access to the Internet, technological infrastructure of the e-learning platforms, and having difficulty using it, which were similar to the literature. In a study conducted with NSs in Jordan, issues such as internet access due to poor connection and lack of computer literacy were emphasized to be the important issues that hinder the distance learning process of nursing education (Kutah, 2021). Yekefallah et al., (2021) pointed out that issues related to the use of e-learning technology may be associated with hardware deficiencies, limitations in computer and internet access, and students' negative satisfaction with e-learning. Harerimana and Mtshali (2021) indicated the importance of adequate educational preparation and hardware competence for information and communication technologies for both educational institutions and learners among the facilitating conditions of e-learning in nursing education. Olum et al., (2021) reported that the increase in internet connection quality and having a computer of their own were associated with more positive attitudes of nursing and medical students toward e-learning. These findings draw attention to the need for a structure with equal opportunities, adequate technological resources and readiness for both educators and learners for the efficient use of e-learning and achieving the desired success.

In this study, more than half of the first-year NSs were found to prefer both classroom and e-learning, and half of the participants preferred only face-to-face classroom courses when this preference was questioned for teaching nursing skills. There are different studies reporting that NSs have negative thoughts about using only distance learning technologies, especially for practical nursing courses (Olum et al., 2020, Suliman et al., 2021). In nursing education, where practical teaching forms an important part, the mandatory interruption due to pandemic conditions, especially the disruption of the teaching process of clinical nursing skills, where face-to-face interaction is very important, has led to concerns and worries in NSs that may arise from feeling inadequate about their education. A study, evaluating NSs' perceptions of e-learning, reported that e-learning sessions mostly helped students understand theoretical knowledge, however, the interaction regarding learning in the e-learning process could not be achieved at the desired level compared to the classroom environment (Sasmal

& Roy, 2021). Only 20.4% of the students were found to believe that e-learning could replace traditional teaching in another study conducted with nursing and medical students during the pandemic (Singh et al., 2021). Suliman et al., (2021) reported that almost all NSs believe that it is not possible to learn clinical skills through online teaching methods. Therefore, it is very important to use innovative teaching methods that would interest students in the integration of e-learning into nursing education to achieve the desired learning achievements, increase understanding and permanence of learning. Logan et al., (2021) reported that an e-learning module, which supports NSs to be better involved with the course content and participate more actively in their learning, positively affects student achievement and results. Chen et al., (2021) indicated that the development of students' ability to actively participate in their learning is positively associated with their academic achievement. Park et al., (2022) stated that participation in learning is an important mediating factor in achieving high academic success in the distance education process. In this study, the majority of NSs reported that the demonstration videos, which are prepared by the responsible lecturer, used in skill teaching, laboratory practice assessment videos requested to support NSs' participation in their own learning and online feedback sessions facilitate their learning. Similarly, Sasmal and Roy (2021) reported that e-demonstration sessions help NSs understand the procedures related to the practice.

The success of e-learning is known to be related to the readiness and attitudes of both educators and students toward adopting this approach (Elbasuony et al., 2018). In this study, it can be stated that first-year NSs had a moderate attitude toward e-learning. Furthermore, the scores of the NSs in the tendency to e-learning and avoidance of e-learning factors were observed to be close to each other. In their study, conducted using the same measurement tool, Ozdemir and Sonmez (2020) reported that Turkish NSs have a tendency to avoid e-learning. It is also possible to come across different studies, conducted both in the pre-COVID-19 pandemic period and during the pandemic period, showing NSs have neutral or negative perceptions and attitudes toward e-learning (Elbasuony et al., 2018; Gaur, Mudgal, Kaur, & Sharma, 2020; Lovric et al., 2020; Oducado & Soriano, 2021; Singh et al., 2021). These findings may be related to the fact that e-learning limits the teaching of nursing skills and clinical practice training when used as the only option. Different studies have shown that e-learning can only be used as an alternative method rather than being the only option for nursing education and that e-learning can create a superior learning style when used in conjunction with traditional teaching methods (McDonald et al., 2018; Lahti, Hatonenet & Valimaki, 2014). However, there are also studies in the literature showing that e-learning methods can perform as well as traditional methods with the use of appropriate learning design and strategies that will maximize the learner's benefit, and e-learning may support the improvement of learning outcomes through practical exercises, repetition and feedback especially in the field of health (Sheikhaboumasoudi et al., 2018; McCutcheon et al., 2015).

It is a known fact that academic success is affected by the characteristics of students, their motivation, or situations such as anxiety (Hauze & Marshall, 2020, Park et al., 2022). In the use of e-learning technologies, many factors that can affect students' attitudes such as the design of the course or the methods and techniques used in the teaching of the course, the adequacy of the interaction between the student and the educator, and the quality of the teaching have been stated to play an important role in the academic success of the students (Al-Abdullatif & Gameil, 2021; Singh et al., 2021; Li et al., 2021,). The results of a qualitative study showed that concerns of NSs' toward e-learning differ according to the years of education, and the concern and worry of the students in the first year of their education are mostly associated with the changes in the learning strategies to be used and the fears of failure that this may lead to (Suliman et al., 2021). In this study, the attitude score toward avoidance of e-learning was identified as an important factor associated with a decrease in NSs' vital sign skills general achievement scores. This result supports the fact that negative attitudes toward e-learning can lead to a deterioration in academic performance. Thapa et al., (2021) have reported that situations that negatively affect the practicality of e-learning, ease of use for learners and increase stress in learning are also associated with attitudes that are more negative toward e-learning. When the results of different studies are examined, the importance of regulations focusing on students' motivation and satisfaction has been emphasized to improve the quality and suitability of e-learning in nursing education (Harerimana & Mtshali 2021; Suliman et al., 2021). Furthermore, it has been emphasized that the academic performance of the students is positively related to their academic motivation, participation in learning and readiness, and individuals with higher academic motivation will also have more positive attitudes toward learning (Park et al., 2010; Khalaila, 2015). Therefore, keeping the situations that may be associated with negative attitudes under control should be considered as a key factor in increasing the success of e-learning in nursing education.

Our study findings indicated that receiving adequate counseling and help on using the e-learning platform is an important factor contributing to the increase in NSs' achievement scores. This finding also suggests that adequate technical support in the e-learning process and supporting students' adaptation to online learning can be a critical component in achieving educational goals by indirectly increasing student satisfaction. In fact, different studies indicated that infrastructure and technological problems in the use of e-learning platforms are associated with a decrease in student satisfaction and reluctance to participate in the course (Yekefallah et al., 2021; Suliman et al., 2021; Kutah, 2021; Gharehbagh et al., 2021; Subedi et al., 2020). Moreover, it is also a well-known fact that perceived learning satisfaction positively affects the participation in the course and the success levels of the students. Li et al. (2021) noted adequate support and assistance among the factors that are effective in facilitating success in online learning. Park et al. (2010) reported that the learning satisfaction of NSs is an important factor associated with e-learning success. While Chan et al. (2021) showed that the increase in the learning satisfaction of NSs was associated with higher learning and course participation, participation in learning was stated as a predictor of academic success in a different study (Park et al., 2022). These results also showed the necessity for user-friendly digital technologies that encourage participation and satisfaction in learning in order to use e-learning as an alternative teaching method in nursing and aiming of improving academic performance.

Another finding we obtained in this study was that the female gender was the most important variable predicting the skill performance of first-year NSs. There are various studies supporting the fact that female NSs have higher academic performance and achievement than males (Wan Chik et al., 2012; Khalaila, 2015). Vizeshfar and Torabizadeh (2018) pointed out that the learning styles of female and male NSs are different from one another and the importance of education based on learning styles to support the academic success of students. It is possible to come across different results in some studies examining the effects of gender in the distance learning process in nursing education. Park et al. (2022) reported that gender is not a factor affecting academic achievement in distance learning. Chan et al. (2021) has shown that there is no significant relationship between gender and higher participation in learning, known to be an important factor for e-learning success. The fact that NSs' skill achievement scores were higher in female students in this study, as reported in some studies in the literature, may be related to female students having a more positive attitude and satisfaction toward e-learning, which is known to be associated with the efficiency and success of e-learning (Yekefallah et al., 2021; Gharehbagh et al., 2021; Gaur et al., 2020). These variables are known to contribute also to the increase in academic success by supporting academic motivation and participation in learning.

This study aimed to evaluate the relationship between first-year NSs' attitudes toward e-learning and their success in learning nursing skills from distance learning, through a skills teaching model. The study results showed that NSs have a moderate attitude toward e-learning, however negative attitudes toward "avoidance of e-learning" may lead to a decrease in NSs' academic achievement. Furthermore, the use of teaching techniques that encourage NSs' participation in their own learning in the e-learning process has been seen to possibly contribute to the teaching of clinical nursing skills. In addition, adequate support and guidance for the solution of issues that may be encountered in the e-learning process and female gender have been determined to positively affect e-learning success.

Limitations

The findings of this study presented a perspective on how attitudes toward e-learning, which has been the only option in ensuring the continuity of nursing education during the COVID-19 pandemic, affect the success of distance learning of nursing skills and contributed to the limited literature in this field. However, this study has some limitations. The examination of the skill learning achievements of the first-year NSs has been limited only to the radial pulse assessment-respiration assessment, apical pulse assessment, and arterial blood pressure measurement skills, which are within the scope of the evaluation of vital signs. Due to both the concerns about the safety of the students and the limited opportunities they have in the home environment, how the attitudes of the students related to e-learning affect the distance learning success of the skills related to invasive interventions could not be examined. Another limitation is that the findings of this study are limited to this sample only. Therefore, the study results cannot be generalized to students in other nursing programs or other higher education institutions.

Practice Implications

Along with the social distancing effects of the COVID-19 pandemic, e-learning has become an element that makes a rapid and compulsory entry into nursing education. In line with the study findings, negative attitudes toward e-learning should be bettered and the factors related to negative satisfaction with e-learning should be controlled to achieve the learning goals in nursing education. Given the integrative importance of theoretical and practical teaching in nursing education, online teaching methods that encourage learning participation and learning should be used in distance education of nursing skills. However, strategies that take into account the differences associated with the characteristics of students, such as gender, known to affect academic achievement, should also be considered in the use of e-learning.

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