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Nursing student´s attitudes toward e-learning: a quantitative approach

Alina de las Mercedes Martínez Sánchez[1] · **Abdullah Karaksha**[2]

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Abstract

This article seeks to determine the attitudes of undergraduate nursing students toward e-learning at the (X). A quantitative, non-experimental, descriptive, and exploratory approach was the procedural methodology selected in this study. A suitable sample of sophomore nursing scholars (n=71) was registered. A total of 58 students returned the questionnaire (82.8% were females). Students who have previous computer training were significantly more confident in connecting to the internet than those with no prior computer training ($t=2.1$, $p<0.05$). Students who had prior experience in e-learning predicted they would feel significantly more nervous when working with computers than those who did not have this prior experience ($t=2.3$, $p<0.05$). In general, our investigation uncovered a differently favorable view of nursing students towards e-learning, however, some negative attitudes were also recorded. Factors likes students` motivation and personalities, backgrounds and feelings related to the control of their educational process must be considered in the application of e-learning.

Keywords Education · e-learning · Nursing · Nursing students · Spain

✉ Alina de las Mercedes Martínez Sánchez
alina.martinez@uam.es

Abdullah Karaksha
a.karaksha@griffith.edu.au

[1] Pedagogy Departament, Universidad Autónoma de Madrid, Calle Francisco Tomás y Valiente, 3, 28049 Madrid, Spain

[2] School of Pharmacy and Medical Sciences, Griffith University, G05-3.15 - Gold Coast Campus, Queensland, Australia

1 Introduction

Electronic learning (e-learning) in healthcare teaching was positioned as an important innovation in education for healthcare professionals. The academic setting is one of the most contexts analyzed concerning to nursing education to develop abilities required, regarding to perform competencies related to nursing care practice (Rouleau et al., 2019).

E-learning is an internet or network-based training method, which comprises a set of instructions provided over electronic media systems (Omar et al., 2012). Debate over an accurate definition of e-learning is still in progress; though it is widely accepted that e-learning is a variety of contents delivered in different formats, i.e., text, video, or image patterns, and electronically offered via internet, laptop, personal digital assistant (PDA) or CD-ROM (Behera, 2013). Despite the diversity of the contents that define e-learning, benefits of the system have been widely documented (Basha, 2020; Marengo, 2005; Regmi & Jones, 2021).

Due to the need of nurses to access up-to-date information on illnesses, medicines, and proficiency, e-learning is of great value to nursing practice (Kadioglu et al., 2020). The advantages of online learning systems on nursing students have been widely documented (Gerkin et al., 2009; Koivisto et al., 2017; Pront et al., 2018; Seada, 2017) and most studies show high levels of satisfaction among students on the use of online learning systems. Likewise, nursing students often refer to advantage and approach as the primary reasons to take online courses. In accordance, some advantages of e-learning have been described. E-learning reduces education costs; e-learning content is punctual and more trustworthy, with an end-to-end learning procedure and the creation of worldwide groups through online interconnection (Ruggeri et al., 2013). Compared with the conventional method, e-learning is cheaper to achieve, self-paced (e-learning courses can be taken when required), quicker (known material can be skipped) and provides more reliable content (traditional education focus on diverse teachers` approach on the same subject) (Cheng, 2012; Jung 2011). The challenging issues of clinical conditions in nursing education limit the student-patient connection within the traditional didactic education. Furthermore, restricted clinical hours and deployments, unreliable existence of patients with illnesses, and each patient's singularity and their support system make the achievement of a high-quality teaching experience for the students even harder (Pfefferle & Stock 2010).

Several authors highlight the benefit of online education in nursing instruction (Morente et al., 2013; Vaona et al., 2018; Wasmiy & Noha 2014). Recently, flexibility in nature regardless of learner geographical place and material access were described as one of the e-learning advantages (Regmi & Jones, 2020). In addition, e-learning has been recognized for continuing professional development for medical and nursing students (Ota et al., 2018). Online education has also been said to result in an enhanced preservation and a greater hold on the topic since lots of aspects that are fused in e-learning highlight the communication, namely video, audio, and quizzes interface. Moreover, e-learning can be simply achieved for large groups of learners (Gross, 2018). Consistent with Keefe & Wharrad (2012), nursing scholars who interface with virtual patients in preconceived situations may prevent unwarranted risks in meetings with real patients.

There is the fact that students might sometimes reject e-learning. The successful execution of e-learning tools relies upon the users' knowledge and skills on computers. Such ingredients are said to involve users' primary endorsement of computer equipment and their hereafter attitude on the use of web-based learning systems (Kim & Moore, 2005; Jones & Jones, 2005). In addition, positive attitudes towards e-learning lead to major chances that learners will adopt this new learning system (Zabadi & Al-Alawi, 2016).

On the contrary, recent studies report negative and uncertain nursing students´ attitudes about e-learning (Soriano & Oducato, 2021; Nsouli & Vlachopoulos 2021; Hvalič-Touzery et al., 2017). Some nursing students consider that face to face lectures increase student knowing more than e-learning classroom (Omolola et al., 2016). The assimilation and application of e-learning has changed and evolving, as are student outlooks. Though the availability of the current academic techniques, teaching and learning are not stimulated by e-learning. Achieving a much better comprehension of students' disposition upon e-learning will give educators deeper vision and prospect for developing strategies that match students' needs (Williams et al., 2011).

To add another layer of complexity, previous research suggested that gender may play a role towards e-learning preference. Males usually have positive experience with technology while females do not like to learn from computers and prefer person-to-person learning (Ausburn et al., 2009 & Johnson,. D. 2011). Another research has suggested that age could impact student performance and interaction with technology (Willey, T., Edwards, S., & Nonchalkier, V. 2008).

Before moving forward in applying this new teaching approach, there is a need to obtain more information concerning nursing students' attitudes towards e-learning, and to determine in what way it could best be implemented for nursing scholars. As mentioned before, E-learning is becoming more essential to the future of nurse education and the facilitation of lifelong learning because of its benefits to extend learning and culture beyond the classroom. Therefore, it is important to examine student expectations concerning of this new learning method (McVeigh, 2009), so foundations and strategies to manage barriers toward e-learning can be designed and implemented. Additionally, research conducted to explore nursing students' attitudes toward e-learning is important considering that it has been encouraged for its ability to captivate learners, customize the learning process and successful implementation in clinical skill acquisition (Bloomfield, 2013). Similarly, the relevance of studies related to the application of e-learning in nursing education has been supported from the perspective of the necessity to perform computer information technology staff development that is of high quality, accessible and tailored to enhance the increasing role information technology has in teaching and learning and the nursing profession (Button et al., 2014). Likewise, e-learning instruction method has shown evidence-based insights in nursing clinical practice to improve professional competences (Beeckman et al., 2008).

To evaluate the impact of e-learning tools, we followed Kirkpatrick (1996), who presented a 4-level evaluation model comprising reaction (1), learning (2), behaviour (3), and results (4). Our study is interested in the first level of evaluation, the reaction, as it measures the students' perception, interest and motivation of the e-learning

tools (Kirkpatrick, 1996). Therefore, this article seeked to determine the attitudes of undergraduate nursing students toward e-learning at the (X).

The following assumptions were proposed:

H_1: A correlation exists between gender and internet self-efficacy toward e-learning.

H_2: A relation exists between computer training and learner computer anxiety.

H_3: A correlation exists between prior experiences of e-learning and students' positive attitudes towards computers.

2 Research methodology

2.1 Research design

A quantitative, non-experimental, descriptive, and exploratory approach was the procedural methodology selected in this study. In the view of Rincon et al., (2003), survey-based analyses are frequently used in the discipline of education perhaps owing to the evident ease and openness of this method. Campoy & Pantoja (2000) highlight surveys' skill to oversimplify results achieved in the population as one of their main benefits. This study used a descriptive method because it best fit our intentions, consistent with the concepts by Fox (1987), who explains the use of the descriptive approach in educational research by virtue of the absence of information, its production and availability.

2.2 Participants

The designed survey was sent to sophomores nursing students who are enrolled in the course Pharmacology for Nursing at the Physiotherapy and Nursing University School, ("X"). The students were chosen using a convenience sampling. Convenience sampling is widely held since it is not costly, not as time expending as other sampling strategies, and simplistic. When used to generate a potential hypothesis or study objective, convenience sampling is effective. When no other sampling method is feasible, convenience sampling can be used to develop hypotheses and objectives for use in more rigorous research studies (Stratton, 2021). According to our objectives, the individuals used in the research are selected because they are readily available and because we know they belong to the population of interest. The prevalence of sampling through non-probabilistic methods (pseudo-random, empirical or snowball) in educational research (Mayorga & Ruiz, 2002).

2.3 Ethical considerations

The Human Ethics Committee from ("X") deemed the study exempt from review. All nursing students in the second year of the bachelor's program were informed verbally about the study one week prior to implementation. Participating in the study was voluntary and anonymity was guaranteed. Neither e-mail addresses nor other personal data were included within online questionnaires to avoid revealing respondents' identities.

2.4 Measurement

After an extensive scientific articles review (Fan, 2005, Maag, 2006, Ali, 2012, Chong et al., 2016, Akimanimpaye, 2015) an ad hoc questionnaire was designed incorporating Semantic Differential Scales measuring attitudes (Guillasper et al., 2020). The instrument consisted of three sections: (1) demographic information (age, gender, pathway to study nursing, experience with an e-learning), (2) self-assessment related to the position in relation to computers, learner's computer uneasiness (seven items), and (3) internet self-efficiency (eight items). The last two sections were designed to determinate students' attitudes towards the use of computers in their learning process, and their confidence in using computers in their learning, respectively. Five-point Likert scales that range from vigorously dissent to actively consent was utilized for opinion level scaling. An "I don't know" option was included in the scale to close the gap produced between what students really know and the scores they get. This approach helps participations to avoid making a guess when they are not aware of the answer (Singh, 2001).

For the reliability of the instrument, the Cronbach's alpha coefficients was determined. The Cronbach's alpha coefficient of the 15-item attitude toward e-learning (Sect. 2 and Sect. 3) scale was 0.88 and 0.7, respectively (Table 1). Therefore, internal consistency of the questionnaire was adequate—an alpha value on top of 0.7 suggests acceptable reliability according to sources (Schrepp, 2020). Overall, the instrument had a good internal consistency resulting in a reliable tool to measure attitudes towards e-learning.

To further assess the validity of the questionnaire, a pilot test was carried out amongst 10 undergraduate nursing students to ensure that the questionnaire precisely addressed the research questions, there were no confusing questions, and that all items were evaluated. No changes were made to the questionnaire based on the results of the pilot test. However, students who contributed to the pilot test were omitted from the study.

The questionnaire was administered electronically (using Google Forms) to students during class time for the subject Pharmacology for Nursing, while reminding them that participation is voluntary and, confidential and their responses will be anonymous.

2.5 Data analysis

The IBM SPSS software, version 22 ® (IBM Corp, Armonk NY) was used to examine the quantitative data. Demographic data including gender and pathway to study nursing, as well as experience with an e-learning, were compared between the students. Cronbach's Alpha test was applied to evaluate the internal reliability of the inquiry form. T-tests and one-way ANOVA test were implemented to establish any significant dissimilarity in attitudes in relation to the e-learning. Probability (p) values of less than 0.05 were interpreted as statistically significant. Population data gender included along with pathway to study nursing, as well as experience with an e-learning, were compared among the students.

Table 1 Descriptive Statistics, Cronbach's Coefficient Alpha

Section 2	Cronbach's Alpha
I think working with computers is very challenging	0.88
I believe in the need of technical skills to work with computers	
I feel so much stressed when working with computers	
Only highly patient can easily work with computers	
Computers are only for youngsters	
I think working with computers would make me have a nervous breakdown	
Computer make me feel dazed and confused	
Section 3	**Cronbach's Alpha**
I feel satisfied when I use computers to navigate the Internet	0.7
I am confident to start with the internet program	
I feel secure when I can enter the internet homepage, I want	
I trust Internet necessary file download	
I trust Internet search engines like Yahoo	
Locating specific pharmacology issues on the internet makes me feel secure	
It's good that I can print material from the internet	
It`s good that I can valuate internes issues	

3 Results

A total of 58 students (81.6% of the class) completed the questionnaire. Most participants were female (82.8%) with an average age of 20.4±2.65 (mean±SD). Most participants (72.4%) came from high school as their pathway to study nursing. All participants had computer facility at home, and more than a half-had computer training experience. Demographics for the sample are found in Table 2.

Data related to student's satisfaction, posture on computers, scholar's computer anxiety, learner internet self-confidence, computer technology are found in Table 3. Most respondents showed a positive attitude towards computer and internet work.

Concerning the first hypothesis (H_1) significant gender differences were found (Table 4). Females were more certain than males about leaving the use of computers to the youngest ($t = -2.0$, $p<0.05$). In other matters, males were way more certain than females about both connecting to the internet and printing materials from the internet ($t=2.6$, $p<0.05$ and $t=2.7$, $p<0.05$, respectively).

Students who have previous computer training were significantly more confident in connecting to the internet than those with no prior computer training (Table 5). Interestingly, students who had prior experience in e-learning predicted they would feel significantly more nervous when working with computers than those who did not have this prior experience ($t=2.3$, $p<0.05$).

Table 2 Demographic data

Variable	n (%)
Gender	
Male	10 (17.2)
Female	48 (82.8)
Pathway to study nursing	
From high school	42 (72.4)
Option for students with disabilities	-
Access experience works	-
Access to 25-year-old scholars or older	1 (1.7)
Access to 45-years-old scholars or older	-
Through specific tests	-
From previous academic qualifications	4 (6.7)
Access to higher technical and sports	11 (19)
Computer system at home	
Yes	58 (100)
No	-
Computer learning experience	
Yes	30(51.7)
No	28 (48.3)
E-learning previous experience	
Yes	36 (62.1)
No	22 (37.9)

4 Discussion

The main aim of this study was to determine the attitudes of undergraduate nursing students toward e-learning in(X). Results suggested that student attitude regarding computers, student computer nervousness and learner internet self-efficacy are the essential aspects that affect student's attitudes toward e-learning and online systems.

The demographic analysis showed that all participants in this study have had access to internet connected computers. This is a picture of the prevalence of computers and the internet in modern societies. Moreover, the majority (82.8%) of respondents were females which is consistent with international and "X" trends in nursing profession. Nursing remains a predominantly female profession, with the proportion of male students has only slightly increased from 7.7% in the 2000 Census to 9.1% in 2010. Moreover, there were only 15.7% male students in the 2013 academic cohort according to the "X" statistic (Bernalte-Martí, 2014). Data from the Women's "X", show that more than 43% of the "X" medical profession are female. However, in the case of nursing, the percentage of female students stands at around 83% (Álvarez-Terán, 2019).

Research suggested that gender is a contributing factor towards e-learning preference. For instance, males exceed females both in computer practice, information technology and positive attitude regarding them (Colley, 2003). On the contrary, females do not like to learn from computers and prefer face-to-face learning (Ausburn et al., 2009; Johnson, 2011). As a result, the study showed a diverse male and female computer attitude towards computers. By means of computer games, male students tend to take computers as both, figures, and pieces of technology to be

Table 3 Student responses to the survey questions

Questions	Strongly disagree n (%)	Disagree n (%)	Don't know n (%)	Agree n (%)	Strongly agree n (%)
For me working with computers is quite complicated	19 (32.8)	30 (51.7)	2 (3.4)	5 (8.6)	2 (3.4)
I think working with computers demands certain technical skills	3 (5.2)	24 (41.4)	8 (13.8)	21 (36.2)	2 (3.4)
Working with computer psychologically stresses to a very high degree	14 (24.1)	28 (48.3)	5 (8.6)	7 (12.1)	4 (6.9)
Working with computer is only recommended for highly persistent people	22 (37.9)	25 (43.1)	4 (6.9)	3 (5.2)	4 (6.9)
Computers make a person more productive	1 (1.7)	10 (17.2)	17 (29.3)	22 (37.9)	8 (13.8)
Computer is for young people's only	41 (70.7)	11 (19)	-	2 (3.4)	4 (6.9)
I feel confident in using connecting to the internet through computers to	9 (15.5)	8 (13.8)	6 (10.3)	21 (36.2)	14 (24.1)
Dealing with computer would make me very nervous	20 (34.5)	15 (25.9)	13 (22.4)	7 (12.1)	3 (5.2)
Computer make me feel troubled and confused	29 (50)	19 (32.8)	4 (6.9)	4 (6.9)	2 (3.4)
Beginning the internet program makes me feel convinced	30 (51.7)	18 (31)	4 (6.9)	4 (6.9)	2 (3.4)
I feel sure linking to the internet homepage that I want	5 (8.6)	15 (25.9)	16 (27.6)	18 (31)	4 (6.9)
I feel confident downloading necessary internet topics	3 (5.2)	9 (15.5)	13 (22.4)	25 (43.1)	8 (13.8)
I feel confident using internet search like yahoo	5 (8.6)	11 (19)	12 (20.7)	19 (32.8)	11 (19)
I feel confident printing material from internet	3 (5.2)	5 (8.6)	8 (13.8)	33 (56.9)	9 (15.5)
I feel confident developing an assessment in internet	2 (3.4)	6 (10.3)	15 (25.9)	23 (39.7)	12 (20.7)

learned. On the other hand, woman students see computers in a distinct way, tending

Table 4 Gender differences in attitudes toward online tools

Variable	Gender		p, statistical test
	Males (10) Mean±SD	**Females (48) Mean±SD**	
Computer is for young people	1.2±0.4	1.6±1.2	p=0.05, t = -2.0
Connecting to the required internet homepage makes me feel confident	3.8±0.8	2.8±1.1	p=0.012, t=2.6
I am confident printing material from internet	4.1±0.3	3.6±1.1	p=0.01, t=2.7

Table 5 Student attitudes towards computers in relation to previous experience

Variable	Computer training		p, statistical test
	Yes (30) Mean±SD	**No (28) Mean±SD**	
Computers increases productivity of the persons	3.8±0.9	3.1±1.0	p=0.004, t=3.0
It's reliable to use computers for online navigation	3.8±1.3	2.9±1.3	p=0.02, t=2.6
I trust connecting to the required internet homepage	3.3±1.1	2.7±1.0	p=0.04, t=2.1
Using Internet search engines like yahoo makes me feel confident	3.6±1.2	3.0±1.2	p=0.06, t=1.9
	Prior experience in e-learning		
	Yes (36) Mean±SD	**No (22) Mean±SD**	
Working with computer would make me very nervous	2.6±1.3	1.8±1.0	p=0.02, t=2.3
Computer make me feel perturbed and bewildered	2.0±1.1	1.5±0.9	p=0.06, t=1.9

to use them as assisting instruments to produce work. Furthermore, women tend to follow the procedures, while men interact with the software in a more lighthearted and experimental way (Lee, 2003).

As for the first hypothesis (H_1), this research shows that there is substantial difference due genus when comparing attitudes toward online tools which includes feeling related to printing material and connecting to the internet homepage. Gender has been shown to influence attitude towards using technology in education with previous research suggested that females prefer to access face-to-face learning methods while males usually have shown a confident stance on the use of technology in learning (Ausburn et al., 2009). Our study supported this finding as males were considerably more confident than females in accessing the internet and printing learning materials from a website. A study conducted by Johnson (2011) reported that women transmitted further, comprehended the atmosphere having greater social presence, were more pleased with the course, regarded the course as of a greater value, and had slightly greater achievement than men. Even though the provocations faced by women in

e-learning contexts, the outcomes of this research indicate that e-learning fields that permit peer-to-peer communication and connectivity could improve women get over some of these handicaps.

In contrast, concerning the second and third hypothesis (H_2 and H_3), this study proves that previous computer experiences and training have impact on e-learning attitudes including: learner computer anxiety and perceived self-efficacy of online tools. Results demonstrated that students who have computer training and previous experiences with e-learning were significantly more confident in using computers in their learning. This finding can be founded by issues which stated that the passion of computer usage and prior experience of online tools have the biggest impact on learners' approaches to e-learning. Moreover, a case study conducted in Romania examined student attitudes towards e-learning as well as analyzing differences in attitude due to socio-demographic profile differences (Mukhametshin et al., 2021). A confident attitude of students in relation to e-learning was reported; the mean was 3.5, as measured on five-point Likert scale. Attitude is additionally motivated by time spent practicing with computer. A study conducted by Çevik (2022) reported that a positive student rated learning teaching efficiency as 82.2% for in-person learning as well as 83% for mixed learning. In addition, the results revealed a positive interrelation among attitude towards e-learning and technical skills. Students most frequently using their computer (54% of the study sample) were more likely to accept e-learning. In other studies, a positive connection was seen among student attitudes towards technology and their degrees of onset to several techniques; while no correlation was found between e-learning attitude and residence (Dalshad et al., 2015). Additionally, it is thought that the common soreness with the technology engenders students who do not have experience with Information Communication Technology communicate themselves carefully about its use in education (Rhema & Miliszewska, 2014; Michael & Marz 2006). In compliance with Popovici (2015) more experienced students in tech use in their daily lives were generally more optimistic about e-learning schemes. Students having a previous e-learning experience are found to possess a greater predisposition to including this learning tools. Fuller et al., (2006) argued that computer anxiety is a state, rather than a trait, which suggests that it is malleable given the appropriate conditions. Therefore, it is essential to run an orientation workshop before the start of the course to upskill students and make them comfortable to utilize the e-learning resources.

5 Conclusions

A Kirkpatrick's Level 1 Evaluation was used to assess nursing students' perception, interest and motivation towards the adaptation of e-learning into their curricula. The benefits of this type of evaluation is to clearly identifies problems and uses student input to generate solutions., Our investigation showed a clearly favorable attitude of nursing students in relation to e-learning, however, some negative attitudes were recorded. These attitudes can somewhat be described by the fact that students be inclined to prefer conventional learning style. Student expectations should be considered when proposing e-learning (Burton , 2003). Factors likes students` motivation

and personalities, backgrounds and feeling related to the control of their educational process must be considered for the application of e-learning (Duggan et al., 2001; Docherty & Sandhu, 2006).

Such issues have been said to affect users' preliminary endorsement to computer technology and their potential behavior towards the use of web-based learning systems. Besides, favorable attitudes towards e-learning show a bigger possibility that students will accept this innovative learning method (Dhiman et al., 2014). Aspects that affect students' attitudes towards e-learning include patience, self-control, software use and skills, good technical skills, as well as managing abilities. As a result, user's attitudes could be either positive, if the original education system fits the undergraduates' needs and features, or negative in case the students do not achieve adaptation to a computerized learning system (Darling-Hammond et al., 2019).

6 Strengths and limitations

Limitations of this study are related to sample and generalization, because it was only developed at a higher education institution; consequently, outcomes cannot be extended to all nursing learners in Spain. We did not evaluate objective learning effects. This research applied only quantitative methods, but a qualitative research method could be used (focal groups, interview, etc.). Future research can build upon our results by using the mixed methods according to its showed benefits (Regnault et al., 2018).

Finally, our sample size was small with only 58 participants, nevertheless, the response rate was very good (86,1%) which is expected for online survey. Our research only asked for attitudes towards e-learning, other research should be carried out to determinate potential causes and factors that influence these attitudes. Therefore, future research using probability sample method must be conducted. This article describes the results of a first approach to the study of nursing students' attitudes towards e-learning in our educational framework. However, new lines of research should be opened to analysis the underlying elements that influence the positive and negative attitudes found. Consequently, provision of appropriate training at different levels with experts regarding e-learning, psychological factors, equipment and technological readiness for the change in learning method, gender and age will be explored in the next phase of our study.

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Statements and Declarations

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