ORIGINAL ARTICLE

# Determination of nursing students' attitudes towards the use of technology

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## Abstract

**Aim:** The use of technology is increasingly important in nursing education and practice. For this reason, it is necessary to determine the attitudes of nursing students towards technology.

**Methods:** This study was conducted with 508 nursing students. A personal information form that was prepared by the researchers and the Attitudes Toward Technology Scale were used as the data collection tools.

**Results:** The mean score that was obtained by the nursing students from the Attitudes Toward Technology Scale was $61.53 \pm 1.13$. The Cronbach's alpha coefficient was found to be 0.90. There was a statistically significant difference between the sexes, using a computer, tablet, or laptop, using technology to reach health-related information, and for professional development, using mobile applications related to drug information. There was also a statistical difference between using the Periscope and Scorpio accounts from social media and using Excel and PowerPoint from Microsoft programs.

**Conclusion:** Nursing students are capable of technology-based teaching, which can be expanded as a result.

**Key words:** attitude, nursing student, technology.

## INTRODUCTION

Having greatly affected many parts of the world, information and communication technology has endeavored to change persons' daily life by providing faster and more convenient communication, easier acquisition of information, and providing a better quality of life (Lee & Clarke, 2015). Advances in information technology, in particular, have brought fundamental changes in healthcare processes that are based on the use of computers and the integration of electronic communication (Gonen, Sharon, Lev-Ari, Strauss, & Segev, 2016). Computer and information technologies have become increasingly widespread. Studies that have investigated the effect of technology have revealed that educational technology has many benefits for students from all ages concerning all issues under

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proper circumstances. Topaloglu (2008) stated that the attitudes of individuals towards technology are quite important and the use of technology in the modern education system is significant. Positive attitudes towards technology are required in order to use technology effectively in the learning environment. Kiyici, Kahraman, and Abali (2012) reported that developing attitudes towards technology and having positive or negative attitudes towards technology are important factors in using technology.

The introduction of the Internet, especially the easy-to-use Web, democratized access to knowledge and provides opportunities for untraditional providers (e.g. virtual colleges and for-profit educational institutions) to offer learning services that meet the life-long educational needs of the workforce. Perhaps, one of the most obvious and significant changes brought about by Internet technology for the educational landscape is the introduction of online classes and programs. Higher education has indeed changed and these changes will shape the way of nursing education to prepare our next generation of nurses. In comparison to other healthcare

professions, nursing often is seen as an early adopter of educational innovations. Nurse educators have taken major steps to transform their curriculum and make use of various educational technologies to facilitate learning (Skiba, Connors, & Jeffries, 2008). There is much progress in the development of new technologies and technological modalities for directly or indirectly improving patient care, as long as new innovations are made every day (Krau, 2015). There is recent evidence that indicates that technology can play a significant role in the management of disease processes (Brammer, McKethan, & Buntin, 2012; Gauthier, 2014).

Technology is used to provide continuous health care in nursing care. Nurses can use technology in various ways to provide nursing care (Van Houwelingen, Moerman, Ettema, Kort, & Ten Cate, 2016). Nursing is an applied discipline that adapts itself with sociocultural, technological, and scientific changes by getting out of the traditional perception and is concerned with individual, family, and community health (Akca Ay, 2007). In traditional nursing, nurses are individuals who work in hospitals, administer medication as prescribed by the doctors, and support the doctors. On the contrary, in contemporary nursing, nurses take an active role in maintaining health and in the treatment of diseases by using the scientific processes in society (Birol, 2007).

Nursing students should be prepared for the use of technology from the start of education for the purpose of increasing the use of computers in healthcare practice (Fidancioglu, Beydag, Fadime, & Kizilkaya, 2009). Informatics and information competencies should be incorporated into the nursing curriculum in order to prepare nursing graduates to meet the ever-changing technological needs of patients (Gardner & Jones, 2012) and to prepare nurses for "high-touch, high-technology" patient care (Hebda & Calderone, 2010). In order to achieve this purpose, first attitudes towards the use of computers should be determined. Then, the necessary arrangements should be made in accordance with the information that has been obtained (Fidancioglu *et al.*).

The attitudes of nursing students towards the use of information technology have been investigated by many researchers (Akimanimpaye & Fakude, 2015; Gonen *et al.*, 2016; Lee & Clarke, 2015). This study presents an innovative view, investigating the important variables that might have an effect on nursing students' attitudes and intention about the use of information technology. The aim of this study was to determine the attitudes of nursing students towards the use of technology.

## MATERIALS AND METHODS

### Participants
The population of this study consisted of 736 nursing students who were studying at the Faculty of Nursing, Akdeniz University, Antalya, in Turkey and the sample consisted of 508 (69.02%) nursing students who agreed to participate in the study.

### Procedure
The data collection were carried out between January 8, 2016 and February 8, 2016 according to routine procedures. The researchers introduced themselves and explained the aim of the study to the students who were available during the data collection and who volunteered to participate in the study. The participants presented their consent forms.

### Measures
The data of the study were collected by using a personal information form that was prepared by the researchers and the Attitudes Toward Technology Scale.

#### Personal information form
The personal information form was used to collect the demographic information of the participants (such as age, academic grade, sex, class, technological devices used, access style of technology, usage time of technological tools, usage purposes of the technology, technological applications for professional development, social media accounts used, and the use of Microsoft programs). The personal information form had 14 questions. It took ~15–20 min to complete this form.

#### Attitudes Toward Technology Scale
Aydin and Karaa (2013) developed the Attitudes Toward Technology Scale and conducted its validity and reliability analysis. The scale consists of 17 items; 15 of these items are positive proposition and the other two items are negative proposition. The scale is a one-dimensional measure. It is a five-point likert scale. While the highest score of the scale is 85, the lowest score is 17. High scores signify positive attitudes of the individuals.

### Data analyses
The statistical analyses were carried out by using the IBM SPSS statistical program (v. 22.0; IBM Corporation, Armonk, NY, USA) with a significance level of

$P < 0.05$. For the statistical evaluation, the means, standard deviations, $t$-test, Kruskal–Wallis and Mann–Whitney U tests were used. The reliability of the scale was tested with the Cronbach's alpha coefficient.

### Ethical considerations

Permission was granted by the authors, Aydin and Karaa, to use the Attitudes Towards Technology Scale. Approval was received from the authors' ethics committee to conduct this study. The informed consent was obtained from the Faculty of Nursing and all the participants. The nursing students were informed about the purpose of the study and what should be expected of them. The participants were informed that they had the right of refusing to participate in the study or withdrawing from the study at any time without any negative consequence. No personal information was recorded on an electronic database.

### RESULTS

The average age of the nursing students was $19.96 \pm 1.29$ (17–25) years, the average academic grade was $2.68 \pm 0.37$ (1.37–3.98), 75% were female, 87.2% accessed the Internet from their smart phone, 93.1% used the Internet for >1 h per day, 60.4% used the technology for professional development, 78.3% used the Word program among the Microsoft programs, and 73.4% used the PowerPoint program. It was found that 49% of the technological applications for professional development were mobile applications that were related to drug information and 42.1% were mobile applications that were related to nursing care plans (Table 1).

The mean score that was obtained by the nursing students from the Attitudes Toward Technology Scale was $61.53 \pm 1.13$. The scale's Cronbach alpha coefficient was found to be 0.90 (Table 2). When the mean scores of the Attitudes Towards Technology Scale were compared in terms of the students' purposes of using technology, there was a statistically significant difference between the attitude regarding the use of technology and sex, the use of a computer, tablet or laptop, the use of Periscope and Scorpio accounts from social media, and the use of Excel and PowerPoint from the Microsoft programs. There also was a statistical difference between the use of technology and the attitude towards technology to achieve professional knowledge ($P < 0.05$). There was a statistically significant difference between the usage purposes of technology and the

**Table 1** Sociodemographic characteristics of the students ($n = 508$)

| Variable | N | (%) |
|---|---|---|
| Age (years) ($\overline{X} \pm SD$) | 19.96 $\pm$ 1.29 | |
|   17–19 | 194 | 38.2 |
|   20–21 | 255 | 50.2 |
|   >22 | 59 | 11.6 |
| Academic grade ($\overline{X} \pm SD$) | 2.68 $\pm$ 0.37 | |
|   <2.50 | 134 | 26.4 |
|   2.50–3.00 | 284 | 55.9 |
|   >3.00 | 90 | 17.7 |
| Sex | | |
|   Female | 381 | 75.0 |
|   Male | 127 | 25.0 |
| Class | | |
|   First class | 197 | 38.8 |
|   Second class | 167 | 32.9 |
|   Third class | 144 | 28.3 |
| Technological devices used | | |
|   Smart phone | 484 | 95.3 |
|   Laptop | 278 | 54.7 |
|   Computer | 235 | 46.3 |
|   Tablet | 158 | 31.1 |
| Accessed style of technology | | |
|   From a Smartphone | 443 | 87.2 |
|   From my own computer | 259 | 51.0 |
|   From my friend's computer | 92 | 18.1 |
|   From the computer in the library of the university | 64 | 12.6 |
| Usage time of the technological tools (h) | | |
|   ≤1 h per day | 35 | 6.9 |
|   >1 h per day | 473 | 93.1 |
| Usage purposes of the technology | | |
|   For social sharing | 450 | 88.6 |
|   For professional development | 307 | 60.4 |
|   To reach health-related information | 304 | 59.8 |
| Technological applications for professional development | | |
|   Mobile applications related to drug information | 249 | 49.0 |
|   Mobile applications related to nursing care plans | 214 | 42.1 |
|   Library databases | 110 | 21.7 |
| Social media accounts used | | |
|   Facebook | 419 | 82.5 |
|   Instagram | 388 | 76.4 |
|   Email account | 329 | 64.8 |
|   Twitter | 243 | 47.8 |
|   Periscope | 46 | 9.1 |
|   Scorpio | 49 | 9.6 |
| Used Microsoft programs | | |
|   Microsoft Word | 398 | 78.3 |
|   Microsoft PowerPoint | 373 | 73.4 |
|   Microsoft Excel | 185 | 36.4 |

SD, standard deviation.

**Table 2** Mean, standard deviation (SD) and Cronbach's alpha of the Attitudes Toward Technology Scale

| Scale | Total item | Score range | $\overline{X}$ | SD | $\alpha$ |
|-------|-----------|-------------|-----|-----|-----|
| Total | 17 | 25–85 | 61.53 | 11.33 | 0.90 |

attitude towards the use of technology (P < 0.05). Those who used technology to reach health-related information had a better attitude towards technology. The difference between the attitudes towards the technological applications used for professional development and those towards the use of technology was statistically significant (P < 0.05). The attitudes of individuals using mobile applications that were related to drug information were more positive (Table 3).

When the use of technology to reach professional knowledge was examined in terms of the descriptive characteristics of the nursing students, it was observed that their sex, class, and average academic grade were statistically significant. But, there was no significant correlation between the use of technology to reach professional knowledge and the age of the students (Table 4).

## DISCUSSION

The ability and self-efficacy of students in using computers might affect their participation in the computer-aided education process and the expectations of the educators. It is important to know what the students' attitudes towards the technology are when the education program they need is being designed and put into practice. As a consequence, this study contributes to the development of a nursing program that defines the attitudes of nursing students towards technology.

When the nursing students' habits of using technological devices were analyzed, it was determined that 95.3% of the students had smart phones, 54.7% had laptops, and 93.1% used their technological devices for >1 h per day. In addition, the results of a similar study that was conducted by Yates, Birks, Woods, and Hitchins (2015) indicated that 89% of the students who participated in the study had a laptop, 78% had smart phones, and 85% used the Internet many times in a day. In another similar study, Akman and Tekindal (2014) found that 99.2% of the students who participated in their study had an email address. George, Davidson, Serapiglia, Barla, and Thotakura (2010) emphasized that the software program that was used

mostly by the students was the medicine guidelines. In the present study, it was found that the number of students using the applications on drug information was higher, compared to those who were using the other applications. It was determined that 82.5% of the students who participated in the present study had Facebook accounts, 76.4% had Instagram accounts, and 64.8% had email accounts. According to the results of the study by Yates *et al.*, it was found that 90% of the students had a Facebook account.

It is seen that the young generation in Turkey uses the Internet, smart phones, and social media accounts very actively. In accordance with these results, it can be asserted that the design of nursing education, in terms of the use of technology, could be a very effective method. It is thought that technology should be used as a basic tool in nursing education and nursing care plans in order to increase success in education and teaching.

In order to determine the reliability of the Likert-type scale, the Cronbach's alpha coefficient should be used (Esin, 2014). In the original scale, the Cronbach's alpha reliability coefficient that gives information on whether or not all of the items of the scale assess the feature that is desired to be measured for the overall scale was $\alpha = 0.87$. This coefficient is at an acceptable level for the overall scale and the scale has internal reliability (Aydin & Karaa, 2013). In the present study, the Cronbach's alpha coefficient of the scale was found to be 0.90. According to the results of the present study, the mean score that was obtained by the students from the Attitudes Towards Technology Scale was $61.53 \pm 1.13$, which meant that the nursing students had a positive attitude towards technology. In a similar study, Tubaishat (2014) also found that the students who participated in that study had positive attitudes towards technology. Positive attitudes and behaviors of young persons towards the use of technology can be translated into positive attainment in nursing education. It is believed that the implementation of technology-based nursing education and nursing care plans for the new generation of young persons will make education more permanent, continuous, and filled with willing and fun.

The result of the present study revealed that there was a significant difference between the sex of the students and their attitudes towards the use of technology (P < 0.05). It was found that the male students had more positive attitudes towards technology than the female students. In the study by Fidancioglu *et al.* (2009), the male students were more interested in the Internet and computers than the female students.

**Table 3** Mean and standard deviation (SD) of the Attitudes Toward Technology Scale on the students' purposes of using technology (*n* = 508)

| Variable | Attitudes Toward Technology Scale ($\overline{X} \pm$ SD) | Z- and P-values | Minimum | Maximum |
|---|---|---|---|---|
| Sex | | | | |
| Female | 60.88 ± 10.69 | Z: –2.832 | 25 | 85 |
| Male | 63.50 ± 12.93 | P = 0.005 | 29 | 85 |
| Used technological devices | | | | |
| Computer | | | | |
| Yes | 63.74 ± 10.89 | Z: –3.712 | 29 | 85 |
| No | 59.63 ± 11.38 | P < 0.001 | 25 | 85 |
| Tablet | | | | |
| Yes | 64.19 ± 11.06 | Z: –3.225 | 29 | 85 |
| No | 60.33 ± 11.26 | P < 0.001 | 25 | 85 |
| Laptop | | | | |
| Yes | 62.83 ± 11.30 | Z: –2.837 | 25 | 85 |
| No | 60.00 ± 11.19 | P = 0.005 | 29 | 85 |
| Usage purpose of technology | | | | |
| To reach health-related information | | | | |
| Yes | 63.08 ± 10.64 | Z: –3.763 | 29 | 85 |
| No | 59.23 ± 11.95 | P < 0.001 | 25 | 85 |
| For professional development | | | | |
| Yes | 62.27 ± 11.25 | Z: –2.830 | 25 | 85 |
| No | 60.41 ± 11.39 | P = 0.005 | 30 | 85 |
| Technological applications for professional development | | | | |
| Mobile applications related to drug information | | | | |
| Yes | 62.91 ± 10.86 | Z: –2.760 | 25 | 85 |
| No | 60.21 ± 11.64 | P = 0.006 | 29 | 85 |
| Social media accounts used | | | | |
| Periscope | | | | |
| Yes | 65.96 ± 13.18 | Z: –2.437 | 33 | 85 |
| No | 61.09 ± 11.05 | P = 0.015 | 25 | 85 |
| Scorpio | | | | |
| Yes | 65.80 ± 13.39 | Z: –2.530 | 33 | 85 |
| No | 61.08 ± 11.01 | P = 0.011 | 25 | 85 |
| Used Microsoft programs | | | | |
| Microsoft Excel | | | | |
| Yes | 63.87 ± 11.39 | Z: –3.604 | 25 | 85 |
| No | 60.20 ± 11.10 | P < 0.001 | 29 | 85 |
| Microsoft PowerPoint | | | | |
| Yes | 62.65 ± 10.42 | Z: –3.205 | 25 | 85 |
| No | 58.44 ± 13.09 | P < 0.001 | 30 | 85 |

Drabowicz (2014) stated that the rate of male students who used computers was higher, compared to the female students. In the study by Yaman (2006), it was determined that the male students used the Internet more effectively. When the correlation between the sex and the purposes of using technology was examined, it was obvious that the rate of the male students who were using the technology to reach professional information was statistically higher. In a similar study, Drabowicz stated that the male students used computers for educational purposes more than the female students.

In Turkey, in terms of daily life responsibilities, women are more actively involved in daily housework, food, dishwashing, mothers' support, and child or sister care than men. Also, it can be asserted that younger women spend more time on activities, such as self-care, hairdressers, shopping etc. In addition, especially in the last 20 years, men have been spending more time on

**Table 4** State of using technology to reach professional information on students' descriptive characteristics (*n* = 508)

| | The state of using technology to reach professional information | | | | |
|---|---|---|---|---|---|
| | Yes | | No | | Z-, KW-, |
| Variable | N | % | N | % | and *P*-values |
| Sex | | | | | |
| Female | 241 | 63.3 | 140 | 36.7 | Z: –2.250 |
| Male | 66 | 52.0 | 61 | 48.0 | *P* = 0.024 |
| Age (years) | | | | | |
| 17–19 | 109 | 56.2 | 85 | 43.8 | KW: 5.189 |
| 20–21 | 162 | 63.5 | 93 | 36.5 | *P* = 0.075 |
| >22 | 36 | 61.0 | 23 | 39.0 | |
| Class | | | | | |
| First class | 100 | 50.8 | 97 | 49.2 | KW: 19.834 |
| Second class | 101 | 60.5 | 66 | 39.5 | *P* < 0.001 |
| Third class | 106 | 73.6 | 38 | 26.4 | |
| Academic grade | | | | | |
| <2.50 | 71 | 53.0 | 63 | 47.0 | KW: 7.331 |
| 2.50–3.00 | 181 | 63.7 | 103 | 36.3 | *P* = 0.026 |
| >3.00 | 55 | 61.1 | 35 | 38.9 | |

KW, Kruskal–Wallis.

technology games at home or in Internet cafés as from childhood and are growing up with technology. For these reasons, it can be asserted that the attitudes of the male students towards technology are more positive than those of the female students.

Another important issue for nursing students is for what purposes the technology is used or should be used. In this study, it was found that the nursing students who were using the technology to reach information for medical and occupational purposes also had positive attitudes towards technology. In parallel with the present study, Piscotty, Kalisch, and Gracey-Thomas (2015) stated that the nurses who were using the mobile applications as a reminder for medical care also were in favor of using the technology in nursing care practices. Moreover, in the study by Eley, Soar, Buikstra, Fallon, and Hegney (2009), >92% of the nurses considered that learning with computers would lead to effective nursing care. In the same study, it was found that the nursing students had positive attitudes towards the use of technology in order to improve the quality of patient care. Nkosi, Asah, and Pillay (2011) emphasized that the opinions on the use of information technology for medical care were positive. In the study that was conducted by Fidancioglu *et al.* (2009), with 123 students, 93.5% of the students stated that the use of a computer was necessary for their job. The statistical difference between the individuals who were using the technology to reach professional knowledge and their attitudes towards the use of technology was significant.

In the present study, the students' sex, class, and average academic grade were statistically significant. The nursing students who were female, upper grade, and had a good academic degree used more technology to reach professional knowledge than the others. Technology-based education programs can be prepared by considering the descriptive characteristics and technological knowledge of nursing students.

It has become quite easy to access health professional information and nursing care through technology in Turkey. In parallel with the increasing number of English-speaking nursing students, the rate of accessing and reading English documents in the international literature also is increasing. Moreover, nursing students easily can access the international literature in different languages by the translation programs that have been developed with technology. There is a growing demand for online documents, instead of printed publications in this way. These research findings could provide guidance on the need for the technology-based development of nursing education action plans.

The potential of technology to affect patient individuality and subjectivity and to create alienation between patients and healthcare providers, in terms of their caring purpose, is obvious (Krau, 2015). There is a need for balance between the humane care aspect of nursing and technology. Younger patients have grown up with computers, the Internet, tablets, and smart phones and take that technology-based learning for granted. However, that still does not replace face-to-face interactions and the impact of customized education on the quality of nursing care. Technology provides an enormous benefit in improving nursing care, but effective nursing will remain a blend of human and technological interventions.

## LIMITATIONS OF THE STUDY

The present study has some limitations. The first limitation was that the study was conducted in one nursing faculty in Turkey. Second, the population of the present study consisted of a small number of young "exclusive" participants; that is, currently enrolled nursing students. Thus, conclusions cannot be generalized to other populations, even nursing students. Also, it is seen as a limitation of this study because participation was voluntary and the attitudes of the students towards technology were based on their own expression.

## CONCLUSION

Nursing education is faced with new challenges as a result of the emergence of the Internet and other information technologies today. In this study that was conducted to determine the attitudes of students towards technology, it was found that the students usually had positive opinions on technology and their attitudes towards technology varied when the sex, type of device, purpose of using the technology, social networks, and Microsoft programs that were used were taken into account. Suggestions of this study are as follows:

- Nursing students should be encouraged to use a computer.
- The use of technology as a training method should be increased.
- Technology-related training programs are recommended for students from the beginning of their education.
- Nursing students are capable of technology-based teaching, which can be expanded as a result.

Programs that are aimed at raising students' awareness of their attitudes, accompanied by interventions to decrease the fear of using information technologies, are important in educational programs. It is recommended that researchers test the Attitudes Toward Technology Scale in different contexts with different samples and conduct more studies on the attitudes towards the use of information technologies to identify other factors that can strongly affect nursing practices and the healthcare industry as a whole.

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## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

## AUTHOR CONTRIBUTIONS

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