Original Article

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Evaluation of Nursing Students' Attitudes Toward Health Technologies in Clinical Practice and Individual Innovative Behaviors: A Cross-sectional and Correlational Study

Hemşirelik Öğrencilerinin Klinik Uygulamalarda Sağlık Teknolojilerine Yönelik Tutumlarının ve Bireysel Yenilikçi Davranışlarının Değerlendirilmesi: Kesitsel ve Korelasyonel Bir Çalışma

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ABSTRACT

Objective: Future nurses' effective use of health technologies requires sufficient knowledge, positive attitudes, individual innovativeness, and self-efficacy behaviors toward these technologies. This study examined nursing students' health technology attitudes and individual innovativeness behaviors.

Methods: This cross-sectional and correlational study involved 346 students with practice experience in the nursing department of a university. Identification form, the Health Personnel Health Technology Assessment Attitude Scale, and the Individual Innovativeness Scale (IIS) were used. Descriptive statistics and correlation test were used.

Results: The mean total score of the Healthcare Personnel Health Technologies Assessment Attitude Scale was 99.58±10.65, and the mean total score of the IIS was 63.65±9.40. A weak positive correlation was found between students' health technology evaluation attitudes and individual innovativeness behaviors.

Conclusion: Health technology should be included in the education of future nurses to teach technological tools, eliminate barriers to their use, and develop innovative behaviors. Positive attitudes will bring along innovative behaviors and ensure faster

ÖZ

Amaç: Geleceğin hemşirelerinin sağlık teknolojilerini etkin bir şekilde kullanabilmeleri, bu teknolojilere yönelik yeterli bilgi, olumlu tutum, bireysel yenilikçilik ve öz yeterlilik davranışlarını gerektirmektedir. Bu çalışmada hemşirelik öğrencilerinin sağlık teknolojilerine yönelik tutumları ve bireysel yenilikçilik davranışları incelenmiştir.

Yöntemler: Kesitsel ve korelasyonel bir çalışmadır. Bir üniversitenin hemşirelik bölümünde uygulama deneyimi olan 346 öğrenciyi kapsamaktadır. Tanımlama formu, Sağlık Personeli Sağlık Teknolojisi Değerlendirme Tutum Ölçeği ve Bireysel Yenilikçilik Ölçeği (BYÖ) kullanıldı. Tanımlayıcı istatistikler ve korelasyon testi kullanıldı.

Bulgular: Sağlık Personeli Sağlık Teknolojileri Değerlendirme Tutum Ölçeği toplam puan ortalaması 99,58±10,65, BYÖ toplam puan ortalaması 63,65±9,40'tır. Öğrencilerin sağlık teknolojilerini değerlendirme tutumları ile bireysel yenilikçilik davranışları arasında pozitif yönde zayıf bir korelasyon bulunmuştur.

Sonuç: Teknolojik araçların öğretilmesi, kullanımının önündeki engellerin kaldırılması ve yenilikçi davranışların geliştirilmesi için geleceğin hemşirelerinin eğitiminde sağlık teknolojisine yer

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ABSTRACT

adoption of developments in health technologies. At this point, it is imperative to support the existing positive attitudes of students and encourage their innovative behaviors.

Keywords: Innovation, nursing, nursing students, health technology, technology

ÖZ

verilmelidir. Olumlu tutumlar yenilikçi davranışları beraberinde getirecek ve sağlık teknolojilerindeki gelişmelerin daha hızlı benimsenmesini sağlayacaktır. Bu noktada öğrencilerin var olan olumlu tutumlarının desteklenmesi ve yenilikçi davranışlarının teşvik edilmesi zorunludur.

Anahtar Kelimeler: İnovasyon, hemşirelik, hemşirelik öğrencileri, sağlık teknolojisi, teknoloji

Introduction

The rapid advancement of health technologies has transformed healthcare delivery, making it more efficient, accurate, and patient-centered. Health technologies encompass not just physical devices but also digital systems and applications that support various aspects of patient care. These include telehealth services that enable remote patient monitoring, mobile health applications that provide real-time data to healthcare providers, and electronic health records that streamline patient information management. The adoption of these technologies in healthcare settings has been driven by the need to improve patient outcomes, reduce medical errors, and enhance the overall quality of care (1,2).

Innovation in nursing is closely linked to the use of these technologies. It involves not only adopting new technologies but also integrating them into daily practice in ways that enhance care delivery (3). Innovative nurses are those who can identify the potential of new technologies, adapt them to their specific clinical settings, and create new solutions that improve patient care (4,5). For nursing students, developing this innovative capacity is crucial, as it prepares them to face the challenges of a rapidly changing healthcare landscape.

Technology is a process developed according to individuals' time, interests, and needs. It involves creating effective and efficient tools and services that simplify life (2,6). The resources society uses in all areas of life are combined with technological knowledge. Innovations brought about by technology and information in healthcare are essential for delivering health services. Healthcare organizations adopt new technologies to improve the quality of patient care. Technology enables healthcare professionals to manage large volumes of data, facilitates workflow, and reduces medical errors, ultimately increasing patient safety and satisfaction (7).

Health technologies include various processes, such as devices, vaccines, medications, clinical practices, procedures, public health practices, and the application of skills and knowledge organized in systems to address health problems and improve quality of life (2,6,8). Many applications and field-specific technologies are involved in every stage of routine care processes (7,9). Nurses utilize technology in diverse ways to provide care to individuals (10,11). In this study, health technologies are defined based on the World Health Organization's definition, including devices such as pulse oximeters, glucometers, and monitors used in clinical applications (8). These technological devices are continually evolving with advancements in technology, necessitating an innovative approach from nurses.

The dynamic nature of health technology requires a proactive approach in the nursing profession, compelling nurses to not only respond to technological advancements but also anticipate and effectively integrate these changes into patient care. This ensures that nurses remain at the forefront of healthcare innovation, continually improving the quality of care they provide (12). Nurses should be competent in using digital and technological solutions to provide effective and patient-centered care (1). Competence in these areas is not merely a skill but a critical component for the survival and advancement of the nursing profession in the modern healthcare landscape (13). Technologies are integrated into profession-specific practices, and adapting and utilizing technological developments to meet the needs of individuals receiving services while following innovative approaches are among the skills and competencies required by the profession (14). These competencies emphasize the importance of flexibility and continuous learning, which are essential for nurses to meet the evolving demands of healthcare. Nurses can improve their professional skills by increasing their individual innovativeness levels.

Individual innovativeness refers to nurses' capacity to embrace change, take calculated risks, and implement new technologies and methodologies in their practice (15). It embodies the willingness not only to accept innovations but also to actively seek out and apply new ideas that can enhance patient care and professional practice. This is particularly important as the knowledge base in healthcare expands and practices evolve, making innovation a necessary component of nursing. As knowledge increases and healthcare practices continuously change, innovation and creativity have become necessities (16). In this context, innovation in nursing transcends mere technological adoption; it involves the thoughtful application of new ideas, processes, and tools to improve care efficiency, meet patient needs more effectively, and reduce operational costs. Innovation in nursing is the application of new ideas, procedures, or techniques to fulfill individuals' needs, reduce costs, and increase work efficiency (3). This innovation is vital not only for improving the quality and sustainability of nursing care but also for ensuring that nursing professionals can keep pace with the rapidly changing demands

of healthcare (4). Studies show that innovation in nursing can enhance treatment effectiveness, quality of care, and professional productivity, facilitating access to health services and reducing care costs (1,5,17). In a rapidly developing world, the nursing profession should emphasize innovation and professionalism (4).

Nursing education plays a crucial role in fostering innovation. To prepare future nurses for the challenges of modern healthcare, educational programs must incorporate innovative strategies that reflect the current and future needs of the profession. This includes integrating health technologies into the curriculum and encouraging students to develop the skills necessary to use these technologies effectively. Nursing education should include innovative strategies according to the profession's needs (4). Furthermore, nursing students should not only be aware of health technologies used in clinical practice but also be encouraged to cultivate a proactive, innovative mindset that enables them to adapt to and even drive change in their future careers. Nursing students should be aware of health technologies utilized in clinical practice, be open to enhancing their skills in these areas, and adopt positive attitudes. A literature review showed that studies of nursing students frequently evaluated the use of information and communication technologies, computer usage, and attitudes toward technology in nursing education (7,10,15,18-21). There are studies (15,22-28), showing the individual innovativeness behaviors of nursing students and nurses and their relationships with different variables. However, while there is substantial research in these areas, a gap remains in understanding how nursing students' attitudes toward evaluating health technologies are linked to their individual innovativeness behaviors in clinical practice. This study aims to fill that gap by exploring these relationships in depth, thereby contributing to a more comprehensive understanding of how technology and innovation intersect in nursing education and practice.

The aim of this study was to explore the relationship between nursing students' attitudes toward health technologies and their individual innovativeness.

Research questions;

1) What are nursing students' attitudes toward health technologies?
2) What is the use of health technology by undergraduate nursing students?
3) What are the individual innovativeness levels of nursing students?
4) What is the relationship between attitudes towards health technologies and individual innovativeness behaviors?

Methods

Study Design

This was a cross-sectional and correlational study. This study followed the Strengthening the Reporting of Observational Studies in Epidemiology reporting checklist (29).

Participants and Sample Size

The study population consisted of second, third, and fourth-year students (n=571) enrolled in the nursing department of a state university in the 2021-2022 academic year. The criteria for inclusion in the sample included being an active second, third or fourth grades student in the fall and spring semesters of the 2021-2022 academic year, and voluntary participation. The exclusion criterion was being a foreign student. The study's sample size was calculated with the G*Power 3.1.9.7 program by establishing a two-way hypothesis (30). The calculation made with a correlation value of 0.30, a margin of error (α) of 0.05, and a power (1-β) of 0.95 determined that the sample size should be at least 330.

Data Collection Procedure

Data were collected through self-report with nursing students between May 20 and June 20, 2022. Students were informed about the study, and informed consent was obtained from those who agreed to participate in the study. Data were collected face-to-face. After informed consent was obtained, the questionnaires were completed. Data collection took about 15 minutes.

Instruments or Data Collection Tools

Data were collected using an identification form, the Health Personnel Health Technologies Assessment Attitude Scale (HPHTAAS) and the Individual Innovativeness Scale (IIS).

Identification Form

The researchers developed the identification form by reviewing the relevant literature (7,10,18-21). This form asked participants nine questions about socio-demographic characteristics and eight about technology.

Health Personnel Health Technologies Assessment Attitude Scale

The scale was developed by Kuşcu et al. (6). It aims to evaluate the attitudes of healthcare professionals toward health technologies. The five-point Likert-type scale consists of 23 items and 3 sub-dimensions. Questions 1-4 constitute the scope dimension, 5-11 constitute the awareness dimension, and 12-23 constitute the benefit dimension. There are no reverse items in the evaluation of the scale. Each response receives a score: 1 for "strongly disagree", 2 for "disagree", 3 for "undecided", 4 for "agree", and 5 for "strongly agree". It is reported that when the average responses to the item approach 1, the level of health technology assessment is low, and when the average responses to the item approach 5, the level of health technology assessment is high. The Cronbach's alpha for the overall scale was 0.95, and for the benefit, awareness, and scope dimensions, they were 0.93, 0.90, and 0.84, respectively. In our study, the Cronbach's alpha for the overall scale was 0.90, with values of 0.90 for the scope dimension, 0.89 for the awareness dimension, and 0.82 for the benefit dimension.

Individual Innovativeness Scale

The scale was developed by Hurt et al. (31) to assess individual innovativeness among teachers and university students. The scale

was adapted into Turkish by Sarıoğlu Kemer and Altuntaş (32) to assess the individual innovativeness of nurses. The Turkish-adapted version includes 18 items, the five-point Likert-type and is structured into three sub-dimensions: thought leadership (items 1,3,4,7,8,10,11), resistance to change (items 5,6,9,12,13,15,18), and risk-taking (items 2,14,16,17). Eleven items of the scale are positive (1,2,3,4,7,8,10,11,14,16,17) and seven items (5,6,9,12,13,15,18) were negative. Negative items are reverse-scored. Scale sub-dimension and total score values are obtained by summing the scores from each item. A minimum of 18 and a maximum of 90 points are obtained from the scale. According to their scores, individuals are categorized as "innovative" with 82 and above, "pioneer" with 75-82, "questioner" with 66-74, "skeptic" with 58-65, and "traditionalist" with 57 and below. As the scores obtained from the scale increase, the innovativeness level of individuals also increases (32). The original scale consists of 20 items with Cronbach alpha value of 0.89 for the total scale. The Turkish-adapted version the Cronbach alpha value of was between 0.82 for the total scale and 0.72 and 0.80 for the sub-dimensions. In this study, the Cronbach alpha value was 0.84 for the overall scale, 0.85 for thought leadership, 0.80 for resistance to change, and 0.85 for the risk-taking sub-dimension.

Ethics

This study was conducted in accordance with the principles of the Declaration of Helsinki. The study's purpose and the content of the forms were explained to the students. They then gave consent for participation. Students were explained that they could leave the study at any time. Ethical permission was obtained from Pamukkale University ethics committee (approval no: E-60116787-020-208262, date: 17.05.2022). Permissions from the place where the data would be collected and from the authors to use the scale were taken.

Statistical Analysis

The data were evaluated with the Statistical Package for the Social Sciences (SSPS) version 29.0 program. Descriptive statistics were used to analyze the data, including number, percentage, mean, and standard deviation. Normal distribution was tested with skewness (0.81-2.00) and kurtosis (1.12-1.65) values, and it was accepted that the data were normally distributed (33). The relationship between the measured variables was evaluated using Pearson correlation analysis. Pearson correlation value ranges are 0.1 small, 0.3 medium and 0.5 large correlation. A value of $p<0.05$ was considered statistically significant in all analyses.

Results

Students' Characteristics

A total of 359 students who matched the inclusion criteria participated in the study. The responses of 13 students contained incorrect and incomplete data, and these students were not included in the study. The study included 346 students. The nursing students that took part in the study had an average age of 21.32±1.52 years. Table 1 gives the socio-demographic characteristics of the students.

Technological devices were used daily by 67.6% of nursing students. Of the students interviewed, 55.8% found the technological equipment in health institutions insufficient. The most common uses of technology were for obtaining information (17.9%), research (17.1%), and sharing information among students (12.4%). Among the barriers to the use of technology, 31.0% ranked the limited number of technological devices, and 22.0% ranked not knowing how to use them. While 82.4% of the students stated they did not receive information about using technological devices, 85.5% wanted to receive training (Table 2).

Health Technology Assessment Attitudes and Individual Innovative Behaviors

The mean total score of the nursing students in the HPHTAAS was 99.58±10.65. This score indicated that their attitude towards evaluating health technologies was high. The mean total score of the IIS was 63.65±9.40. According to the score above this average, students were in the category of "skeptical" about innovation. (Table 3).

The Relationship Between Health Technology Assessment Attitudes and Individual Innovative Behaviors

A weak positive correlation was found between the total score of health technology evaluation attitudes and opinion leadership ($r=0.178$, $p<0.01$), risk-taking ($r=0.187$, $p<0.01$), and individual innovativeness total score ($r=0.158$, $p<0.01$). A weak positive relationship was found between the individual innovativeness total score and the sub-dimensions of scope ($r=0.134$, $p<0.05$),

Table 1. Socio-demographic characteristics

	n	%
Gender		
Female	295	85.3
Male	51	14.7
Year of study		
2nd year	125	36.1
3rd year	131	37.9
4th year	90	26.0
Employment status		
Yes	18	5.2
No	328	94.8
Place of living		
City	140	40.5
Small town	124	35.8
Village	82	23.7
Insurance		
Yes	218	63.0
No	128	37.0
Incoming		
Income more than expenditure	34	9.8
Income equal to expenditure	204	59.0
Income less than expenditure	108	31.2

Table 2. Students' use of technology

	n	%
Frequency of technological device use in nursing practices		
Daily	234	67.6
Once a week	74	21.4
Rarely	38	11.0
Technological devices used in patient care*		
Phone	173	7.1
Computer	141	5.8
Glucometer	259	10.6
Pulse oximeter	322	13.2
Monitor	302	12.4
Digital thermometer	317	13.0
Digital blood pressure meter	187	7.7
Air/Adjustable bed	188	7.7
Pump Device	196	8.0
Pneumatic system (system that transports blood samples to the relevant laboratory)	123	5.0
Bedside aspiration and oxygen systems	233	9.5
Finding technological devices sufficient		
Yes	153	44.2
No	191	55.8
Reason for using the technological device*		
Sharing information among students	204	12.4
Obtaining information	294	17.9
Planning patient care	195	11.9
Research	281	17.1
Providing patient care	159	9.7
Planning the treatment	118	7.2
Making treatment	136	8.3
Accepting samples (blood, urine, stool, etc.)	73	4.4
To follow the results of the patient's procedures	184	11.2
The barriers to the use of technology*		
Being costly	83	9.6
Not knowing how to use them	190	22.0
Lack of calibration	98	11.4
The limited number of them	267	31.0
The language of the device is not Turkish	50	5.8
Complexity of the operating system	72	8.4
Not authorized to use the device	102	11.8
From whom/where they get support in using technology*		
Biomedical engineer	14	1.7
Work colleague	261	31.8
Charge nurse	325	39.5
Information Processing Unit	37	4.5
The Internet	142	17.3
Instruction manual of the device	43	5.2
Getting information about the use of technological devices		
Yes	61	17.6
No	285	82.4
Desire to receive training in biomedical technology		
Yes	296	85.5
No	50	14.5

*: More than one answer was given

awareness (r=0.154, p<0.01), and utility (r=0.125, p<0.05) (Table 4).

Discussion

This study examined the health technology evaluation attitudes and individual innovation behaviors of nursing students. The results showed while nursing students' attitudes toward technology use were high, their innovation behavior was "skeptical". The most important barriers to students' use of health technologies were identified as limited number of devices and not knowing how to use them. There was a weak positive association found between students' health technology evaluation attitudes and individual innovativeness behaviors.

The use of Health Technologies and The Barriers to the use of Health Technology

It is essential to apply technology at all stages of nursing education and to evaluate the results. Technology use in the clinical environment helps students develop critical thinking, clinical reasoning skills, and problem-solving skills. (34). In this study, most nursing students use technological devices in their clinical practices, including pulse oximeters, digital thermometers, monitors, and glucometers. Students take an active role in patient monitoring. Additionally, they use health technology to obtain information and conduct research. However, students use patient care devices less frequently because they participate in care procedures alongside licensed nurses and primarily focus on follow-ups. As they are not yet professional nurses, they cannot be independent in the use of these devices. Student nurses learn clinical and technological skills from clinical educators and clinician nurses who serve as professional role models (35).

Future nurses' adoption, understanding, and application of the use of technology in the provision of health services will enable them to be competent and effective (36). To successfully implement health technologies, nurses should have positive attitudes, sufficient knowledge, basic competence, appropriate behaviors, digital self-efficacy and technology-specific self-efficacy (1). Health technology assessment attitude and individual innovation behaviors are other factors they should have.

In the modern digital age, many students find health technology insufficient in the institutions where they practice. Many factors can contribute to this insufficiency. For example, the increased cost associated with rapidly developing technology makes it difficult for institutions to maintain equipment that is suitable for technological advancements (35). In this study, students identified the lack of technological devices, high costs, and inadequate calibration as barriers to the use of technology. Factors such as hospital capacity and the high number of patients may also contribute to the insufficiency of existing health technology. In addition, clinical educators and nurses may find it challenging to accept and integrate new technologies into practice.

In this study, more than half the students stated that not knowing how to use a technological device was an obstacle. Students did not receive sufficient education on this subject. Students often receive support from clinical educators, charge nurses, and other students in accessing information about the use of technology. Literature supports that using technology can be learned through role models and peer support (37). However, courses and training related to health technologies should be added to the curriculum. Another study suggested that digital technologies should be fully integrated into the nursing curriculum. However, this is delayed due to inconsistencies and irregularities between

Table 3. Descriptive data of scales and subscales

Variables	Mean	SD	Min.	Max.
Thought leadership	24.58	4.65	8.00	35.00
Resistance to change	23.26	5.23	7.00	35.00
Risk-taking	15.81	3.09	4.00	20.00
Total score of IIS	63.65	9.40	38.00	89.00
Scope	17.26	2.27	4.00	20.00
Awareness	31.28	3.58	7.00	35.00
Benefit	51.03	6.67	34.00	88.00
Total score of HPHTAAS	99.58	10.65	67.00	132.00

SD: Standard deviation, Min.: Minimum, Max.: Maximum, HPHTAAS: Health Personnel Health Technologies Assessment Attitude Scale, IIS: Individual Innovativeness Scale

Table 4. Correlation between the scales

	Thought leadership	Resistance to change	Risk-taking	Total score of IIS
Scope	0.068	0.113*	0.114*	0.134*
Awareness	0.112*	0.097	0.137*	0.154**
Benefit	0.198**	-0.063	0.187**	0.125*
Total score of HPHTAAS	0.178**	0.014	0.187**	0.158**

*: Correlation is significant at 0.05 level, **: Correlation is significant at the 0.01 level, HPHTAAS: Health Personnel Health Technologies Assessment Attitude Scale, IIS: Individual Innovativeness Scale

nursing education programs and institutions (35). Adding relevant objectives and courses to updated nursing education programs is recommended (25,38). Students' willingness to learn biomedical technology supports this. Shen et al. (25) emphasized that the innovative education program played an important role in increasing nursing students' innovative behaviors, self-efficacy, and professionalism. Accordingly, the nursing education curriculum should be updated regularly and should be able to follow innovations.

As a Factor Associated with Health Technology Evaluation Attitudes: Individual Innovative Behaviors

The literature shows that nursing students and nurses have different scores and are in different categories regarding innovativeness. The adoption of innovations varies among individuals; those who fear uncertainty may resist change (36). According to a survey, nurses' opinions on the purposeful use of technology vary; some are excited, while others are apprehensive or opposed (39). A study attributes the slow adoption of digital technologies to resistance primarily due to economic problems and fear of machines potentially "taking over in work" (35). The skeptical approach to innovative behaviors shows that the innovation is not adopted until others accept, use, and benefit from it. In this case, a supportive approach is important for nursing students to practice their profession.

Studies evaluating innovation behavior in nursing students generally found skeptical (26,27) or questioning (15,23,24) behavior. They determined that individual innovativeness in nursing students was positively associated with 21st century skills (22) professionalism (25) entrepreneurial tendencies (24), and attitudes toward evidence-based nursing (40) and negatively associated with using technological equipment (15). The individual innovation approach affects students positively. For educators and clinician nurses to be suitable role models in increasing the innovation behaviors of nursing students, training on awareness, information, adoption, and use of health technologies should be provided.

While nursing students' attitudes toward technology use were high, their innovation behavior was "skeptical". In skeptical behavior, the individual needs to believe and trust to adopt innovation and needs reliable support and resources to adopt the innovations brought by technology (41,42). The fact that students are in the internet generation-generation z and use technology for visual and verbal communication (43) explains their high technology attitudes. Value judgments, attitudes, and expectations differ between generations depending on the developments and innovations in the environment. This also affects their adaptation processes and ability to innovate (23). A positive attitude is important in increasing technological solutions, increasing efficiency reducing errors and improving patient care (1). In the digital age, when nursing students are informed about the effectiveness and usefulness of the technology used in clinical practice, their individual innovation levels will increase.

Students' health technology attitudes positively increase their innovativeness behaviors. Students' health technology attitudes and innovation behaviors are related, although not strongly. The environment in which nurses work is impacted by developments in science, technology, and health. They frequently come across advances in their work practices and make good use of them (44). Health technology adoption and use is more likely among nurses who are receptive to learning new skills and technologies. However, nurses with low self-efficacy or resistance to change can be more reluctant to adopt these tools (1). Based on the positive relationship between innovation and innovation, high health technology attitudes of student nurses may increase their innovation behaviors. Positive attitudes will bring along innovative behaviors and ensure faster adoption of developments in health technologies. At this point, it is imperative to support the existing positive attitudes of students and encourage their innovative behaviors.

Study Limitations

This study had some limitations. It did not consider the possible effects of demographic variables on the dependent variables. Participants were selected through random sampling; since this is a weak sampling method, it may have affected the reliability of the results. A further limitation is that the outcomes can only be generalized to nursing students of one university.

Conclusion

The use of technology in health services will prepare students and future nurses to be more competent and effective. This study revealed that students' knowledge of health technologies was not sufficient, and they wanted more information. A positive relationship existed between students' health technology evaluation attitudes and individual innovativeness behaviors. Health technologies should be included in nursing education, especially technological tools used in patient care. Factors preventing their use should be eliminated. Nurses should increase their digital literacy and be open to innovations that will maximize care. Increasing individual innovativeness will positively affect the attitude towards health technologies. A positive increase in nurses' use of technology and their attitudes towards evaluating health technologies will facilitate adaptation to the digitalizing world. Nurses and nursing students should be followers of health technologies and every technological development affecting health care.

Ethics

Ethics Committee Approval: Ethical permission was obtained from Pamukkale University ethics committee (approval no: E-60116787-020-208262, date: 17.05.2022).

Informed Consent: Students were informed about the study, and informed consent was obtained from those who agreed to participate in the study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: İ.Ö.Ç., F.H.İ., N.K., E.Ö.B., Concept: İ.Ö.Ç., F.H.İ., N.K., E.Ö.B., Design: İ.Ö.Ç., F.H.İ., N.K., E.Ö.B., Data Collection or Processing: İ.Ö.Ç., F.H.İ., N.K., E.Ö.B., Analysis or Interpretation: İ.Ö.Ç., F.H.İ., N.K., E.Ö.B., Literature Search: İ.Ö.Ç., F.H.İ., N.K., E.Ö.B., Writing: İ.Ö.Ç., F.H.İ., N.K., E.Ö.B.

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References

1. Conte G, Arrigoni C, Magon A, Stievano A, Caruso R. Embracing digital and technological solutions in nursing: a scoping review and conceptual framework. Int J Med Inform. 2023:105148.
2. Ruiz-Morilla MD, Sans M, Casasa A, Giménez N. Implementing technology in healthcare: insights from physicians. BMC Med Inform Decis Mak. 2017;17:1-9.
3. Yuan F, Woodman RW. Innovative behavior in the workplace: The role of performance and image outcome expectations. Acad Manage J. 2010;53:323-42.
4. Alkhaqani A. Innovative strategies in nursing practice: new perspectives. Nurs Commun. 2022;6:e2022008.
5. Asurakkody TA, Shin SY. Innovative behavior in nursing context: a concept analysis. Asian Nurs Res. 2018;12:237-44.
6. Kuşcu FN, Yılmaz FÖ, Karatepe HK. Health personnel health technologies assessment attitude scale (HPHTAAS): a methodological study. JAVStudies. 2022;8:56-65.
7. Lee JJ, Clarke CL. Nursing students' attitudes towards information and communication technology: an exploratory and confirmatory factor analytic approach. J Adv Nurs. 2015;71:1181-93.
8. World Health Organization. Health technologies: report by the secretariat. World Health Organization, 2007. Available from: https:// i ris.who.int/bit s t ream/handle/10665/22609/A60_R29 en.pdf?sequence=1&isAllowed=y
9. Locsin RC, Purnell M. Advancing the theory of technological competency as caring in nursing: the universal technological domain. Int J Hum Caring. 2015;19:50-4.
10. Terkes N, Celik F, Bektas H. Determination of nursing students' attitudes towards the use of technology. Jpn J Nurs Sci. 2019;16:17-24.
11. van Houwelingen CT, Moerman AH, Ettema RG, Kort HS, Ten Cate O. Competencies required for nursing telehealth activities: a Delphi-study. Nurse Educ Today. 2016;39:50-62.
12. Archibald MM, Barnard A. Futurism in nursing: technology, robotics and the fundamentals of care. J Clin Nurs. 2018;27:2473-80.
13. Kim S-J, Park M. Leadership, knowledge sharing, and creativity: the key factors in nurses' innovative behavior. J Nurs Adm. 2015;45:615-21.
14. Yıldırım F, Abukan B, Öztürk H, Eker H. Use of technology in social work and digital capabilities of social workers: an evaluation in the focus of the Covid-19 pandemic. Turkish Studies. 2020:1308-2140.
15. Turan N, Kaya H, Durgun H, Asti T. Nursing students' technological equipment usage and individual innovation levels. Comput Inform Nurs. 2019;37:298-305.
16. Kara D. Innovation in nursing practices. Glob J Pure Appl Sci Technol. 2015;7:170-4.
17. Lin C-L, Wang Y-N, Tsai H-M. Innovative thinking in nursing practice. Hu Li Za Zhi. 2013;60:97.
18. Gündoğdu H, Erol F, Tanrıkulu F, Filiz NY, Kuzgun H, Dikmen Y. Determination of attitudes of nursing students towards information and communication technologies. Int J Hum Sci. 2018;15:441-50.
19. Korkmaz A, Korkmaz AÇ. Nurse candidates' attitudes towards computer use in nursing. YASAD. 2018;8:1-18.
20. Özen N, Yazıcıoğlu İ, Çınar Fİ. Analyzing the correlation between the attitudes of nursing students towards using computers in health care and clinical decision making skills. J Educ Res Nurs. 2017;14:112-8.
21. Şahin E, Yavan T, Demirhan M, Aydın M, Yeşilçınar İ. Determination of attitudes of nursing students towards information and communication technologies. BSJ Pub Soc Sci. 2020;12:193-202.
22. Atasoy I, Özdemir SÇ, Evli M. Relationship between individual innovativeness and 21st-century skills of nursing and midwifery students: a cross-sectional study. Nurse Educ Today. 2023;126:105830.
23. Başoğlu M, Edeer AD. Comparison of generation X and Y nurses and student nurses' individual innovativeness awareness. Gümüşhane Univ J Health Sci. 2017;6:77-84.
24. Bodur G. The relationship between individual innovativeness and entrepreneurship tendency of nursing students. J Health Sci Prof. 2018;5:139-48.
25. Shen Y, Xie W, Wang X, Qu J, Zhou T, Li Y, et al. Impact of innovative education on the professionalism of undergraduate nursing students in China. Nurse Educ Today. 2021;98:104647.
26. Sis-Çelik A, Bayrakçeken E, Kılınç T. Individual innovation characteristics according to nurses' gender roles and affecting factors. J Anatolia Nurs Health Sci. 2020;23:397-409.
27. Tarhan M, Doğan P. The relationship between nursing students' individual innovative behaviors and autonomy levels. J Health Sci Prof. 2018;5:51-8.
28. Yayla A, Sarıoğlu-Kemer A. The Effect of individual innovativeness characteristics on attitudes towards evidence-based practices in X and Y generation nurses. J Health Nurs Manag. 2020;7:271-9.
29. Wang X, Cheng Z. Cross-sectional studies: strengths, weaknesses, and recommendations. Chest. 2020;158:S65-71.
30. Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behav Res Methods. 2007;39:175-91.
31. Hurt HT, Joseph K, Cook CD. Scales for the measurement of innovativeness. Hum Commun Res. 1977;4:58-65.
32. Sarıoğlu Kemer A, Altuntaş S. Adaptation of the individual innovativeness scale in nursing profesion: Turkish validity - reliability study. J Educ Res Nurs. 2017;14:52-61.

33. George D, Mallery M. SPSS for windows step by step: a simple guide and reference, 17.0 update Boston. Pearson. 2010.
34. Şenyuva E. Reflections on nursing education of technological developments. Florence Nightingale Hemsire Derg. 2019;27:79-90.
35. Hack-Polay D, Mahmoud AB, Ikafa I, Rahman M, Kordowicz M, Verde JM. Steering resilience in nursing practice: examining the impact of digital innovations and enhanced emotional training on nurse competencies. Technovation. 2023;120:102549.
36. Honey M, Collins E, Britnell S. Education into policy: embedding health informatics to prepare future nurses-New Zealand case study. JMIR Nursing. 2020;3:e16186.
37. Walker S, Dwyer T, Broadbent M, Moxham L, Sander T, Edwards K. Constructing a nursing identity within the clinical environment: the student nurse experience. Contemporary nurse. 2014;49:103-12.
38. HUCEP HUÇEP-NNCEP. HUCEP 2022. 2022. Council of Higher Education (YÖK). Available from: https://www.yok.gov.tr/Documents/Kurumsal/ egitim_ogretim_dairesi/Ulusal-cekirdek-egitimi-programlari/ hemsirelik_cekirdek_egitim_programi.pdf. Accessed September 2023
39. Kaye SP. Nurses' attitudes toward meaningful use technologies: an integrative review. Comput Inform Nurs. 2017;35:237-47.
40. Baltacı N, Metin A. The relationship between nursing students' individual innovativeness levels and attitudes to evidence-based nursing. J Inonu Univ Health Serv Voc Sch. 2021;9:578-93.
41. Kılıçer K, Odabaşı HF. Individual innovativeness scale (IIS): the study of adaptation to Turkish, validity and reliability. Hacettepe University Journal of Education. 2010:150-64.
42. Rogers EM. Diffusion of innovations: modifications of a model for telecommunications. Die diffusion von innovationen in der telekommunikation. 1995:25-38.
43. Bencsik A, Horváth-Csikós G, Juhász T. Y and Z generations at workplaces. J Compet. 2016;8:90-106.
44. Sarıoğlu Kemer A, Hendekci A, Erbil B. Are nurses innovative or ambidextrous leaders? An evaluation from the perspective of prospective nurses: a structural equation modeling-multiple group analysis. Nurse Educ Today. 2022;119:105574.