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Nursing Students' Views and Experiences Concerning the Use of Mobile Applications in Nursing Education: A Qualitative Study

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Abstract

Background: Nursing education is a process of education that consists of both theoretical and skill teaching. Mobile applications developed in accordance with smart phones have started to be used in nursing education, for the students to continue to learn outside school and develop their knowledge and skills.

Methods: This study was conducted in the Department of Nursing in the Faculty of Health Sciences at a University located in the western region of Turkey between the dates of between May 7, 2019, and May 30, 2019, by using qualitative research design. Qualitative research was planned in order to examine the opinions and experiences of nursing students who used the mobile application. Purposeful sampling method was used in the study.

Results: The findings of the study, the students (45.5%) indicated that the mobile application prepared was appropriate for their level and the mobile application was adequate for them (52.3%). The study also pointed out that nursing students were curious (75%) and thought that it would be useful (31.8%), were excited (22.7%), felt special (20.5%), were relaxed (20.5%) and felt happy (27.3%). The students indicated that they had less stress (68.2%), felt enlightened (90.9%), felt competent on the subject (63.6%) and had more self-confidence (29.5%) after using the mobile application. All of the nursing students (100%) reported that it was necessary to use mobile applications in nursing education.

Conclusion: It was seen that using the mobile application in nursing education increased the students' self-confidence and self-competence, and also reduced their stress. Besides, the students belive that it will be useful to use both standard teaching method in which the instructor lectures and relevant mobile applications together.

Introduction

Nursing education is a process of education that consists of both theoretical and skill teaching. Primary purpose of nursing education is to train qualified nurses [1,2]. An important part of nursing education consists of psychomotor skill teaching. Psychomotor skill indicates a skill which is performed rapidly, accurately and skilfully [3]. It is expected from nursing students to possess the complete competence in the taught skills [1,3]. In the nursing curricula, methods such as expressions, demonstrations, control lists, case scenarios, role plays, videos and simulated/standardized patients are used for the students to acquire theoretical knowledge and skill [4-7]. Today, mobile phones are also started to be used as an educational tool in nursing education with the developments in mobile technologies [8,9].

Together with the development of mobile technologies in the present day, mobile phones have become an inseparable part of our daily lives [8-10]. Mobile phones have become popular among users as they are portable, multi-purpose, provide a continous accessibility and offer social network services [9,11]. The developing information technologies

have facilitated the use of mobile phones in the field of education, as in all other fields [12,13]. Especially mobile applications developed in accordance with smart phones have started to be used in education [11,13]. Mobile applications are software that are designed and coded specifically for mobile devices such as smart phones and tablets [14,15]. Mobile applications have also started to be used in nursing education where psychomotor skills are of prime importance, for the students to continue to learn outside school and develop their skills [16-19]. Mobile applications facilitate reaching information, help to learn while having fun and provide the liberty of time and place in learning [17,18].

Considering the studies using mobile applications in nursing education; it is seen that mobile applications increase the students' knowledge and skills [1,4,11,20-24], enhance their self-confidence [23-25], reduce their stress [25], increase their competence [20,21] and enhance their learning motivation [21]. Examining the literature; it is seen that there are mostly quantitative studies evaluating the effectiveness of mobile applications [2,20-24], whereas there is a limited number of qualitative studies revealing the students' views and experiences concerning mobile applications [18,26].

In the literature, it is suggested to include mobile technologies to education in order for students to improve themselves in the fields of theory and skill in nursing education. Due to the easy-accessibility and portability features of mobile technologies, learning activities such as repeating a subject and reinforcing application steps can be maintained outside of the classroom environment [23,24]. Students can initiate the learning process whenever and wherever and intervene in the process whenever they desire. Moreover, mobile technologies in nursing education are extremely important in terms of presenting research diversity, the convenience of information retrieval, personal learning, and the possibility of instant feedback and evaluation [20,24,25].

It is required for nursing students to improve themselves by practicing before performing clinical applications without risking the safety of patients and themselves. Additionally, the excessive number of students in the nursing departments, insufficient number of instructors, time restriction and lack of proper laboratory environments prevent students to improve the psychomotor abilities at the desired level [11,23]. In nursing education in which psychomotor skills are significant, the use of mobile technologies in terms of maintaining out-of-class learning and improving knowledge and the skills of students would contribute greatly to nursing education [14,20]. This study was conducted to determine the nursing students' views and experiences concerning the use of mobile applications in nursing education.

Method

This study was conducted in the Department of Nursing in the Faculty of Health Sciences at a university located in the western region of Turkey between the dates of May 7, 2019, and May 30, 2019 by using qualitative research design. In the study, a blood pressure mobile application was installed on the android phones of 178 students who were studying in the first grade of the department of nursing. The students were asked to use the installed mobile application between the dates of March - April 2019. Qualitative research was planned in order to examine the opinions and experiences of students who used the mobile application. Purposeful sampling method was used in the study. The purposeful sampling method is a method that is frequently used in qualitative research designs and provides the obtainment of information that was not obtained with other methods without calculating the sample size [27,28]. The study was completed with 44 students until the knowledge is started to be repeated at the saturation point.

Data collection tool

In this study, the data were collected via a semi-structured interview form which was developed by the researchers in accordance with the study objective. The first part of the interview form consists of three questions about age, gender and graduation school. The other part consists of twelve questions about the students' time spent on the internet, purpose of using mobile phone, phone applications, status of using mobile applications during their former education, environments where they use mobile applications, thoughts about the mobile application prepared for nursing education, frequency of using the mobile application, feelings about using the mobile application, problems faced while using the mobile application, feelings (such as self-confidence, stress, self-competence) about the use of the mobile application while applying skill, thoughts about whether to use mobile applications in nursing education or not and suggestions about developing mobile applications in nursing education.

Implementation of the study

The interviews were conducted in hours when the students and researchers were available, in a room where only the researchers and students were present, using the focus group interview technique via the semi-structured interview form which had been prepared beforehand. Focus group discussion is a significant tool in collecting qualitative data. In this method, the data is obtained from individuals who were chosen purposefully rather than a wider sample group. Focus group discussion is a qualitative method that aims to acquire information about the psychological and socio-cultural features and behaviors that groups perform

semiconsciously or unconsciously and to learn the underlying causes [29].

The participants were given numerical codes and were asked to sit down without giving their names before the interviews. The students were reminded of the confidentiality of information shared during the interviews. Before the study, they were informed that the interviews would be recorded via recorder and an interviewer would take notes. The moderator and observer introduced themselves before the interviews and then the interviews were conducted. The interviews took approximately 55 minutes and as the answers were satisfying enough, the study was completed in six sessions. Distribution of the number of each interview and participant is as follows; 1. Interview: Seven participants, 2. Interview: Eight participants, 3. Interview: Eight participants, 4. Interview: Seven participants, 5. Interview: Seven participants, 6. Interview: Seven participants, which makes a total of 44 nursing students.

Data analysis

In this study, the record content was written down, analyzed with observation notes and deciphered after each interview. The content analysis method was used in analyzing the data. The content analysis aims to attain concepts and relationships that can explain the data collected, to define the data and to reveal the truth that may be hidden within the data. In order to provide internal validity of the qualitative study, the texts of the interviews, codes and reproduced categories were evaluated and confirmed by an expert who was experienced in qualitative studies via expertization, for the purpose of examining the analysis process [27]. The data acquired were expressed with numbers and percentages. The obtained data from the participants were read, significant sentences or statements were underlined and coded by separating into significant sections. Then, six themes were created by classifying the codes with the same meaning. In accordance with the data obtained from the study, main themes were determined under the titles of opinions towards the mobile application, the aim of using the mobile application, the emotions students felt in the mobile application process, the difficulties experienced in the mobile application process, the benefits of the mobile application in nursing education, and the use of the mobile application in nursing education.

Ethical considerations

In order to conduct the study, an ethical approval was received from Mugla Sitki Kocman University Scientific Researches and Publication Ethics Council (Protocol no: 190088/86/2019) and a permission from the institution where the study was conducted. In addition, the study purpose was explained to the students who participated in the study and their written consent was received.

Results

Among the students who participated in the study; 81.8% are in the age range of 18-19 years, 72.7% are

Table 1: Demographic characteristics of the nursing students (n = 44).

Demographic Characteristics	n	%
Age		
18-19 years	36	81.8
≥ 20 years	8	18.2
Gender		
Female	32	72.7
Male	12	27.3
Last Graduated School		
Anatolian high school	30	68.2
Basic high school	9	20.5
Science high school	4	9.1
University	1	2.2

Table 2: Distribution of nursing students regarding their mobile phone usage (n = 44).

	n	%
Amount of mobile phones are used by the students		
2 - 4 hour	16	36.4
> 5 hour	28	63.6
Average time spent on the internet (hour)	4.75 ± 1.64 (Min: 2 - Max: 12)	
Purpose of mobile phone usage*		
Social media	44	100.0
Talking	44	100.0
Reading books	33	75.0
Homework	32	72.7
Watching movies	25	56.8
Listening music	25	56.8
Watching videos	22	50.0
Playing games	15	34.1
Messaging	13	29.5
Regularly used mobile applications*		
Instagram	44	100.0
WhatsApp	44	100.0
YouTube	44	100.0
Game apps	26	59.1
Music apps	24	54.5
Movies apps	12	27.3
Other educational apps	6	13.6
Shopping apps	6	13.6
Reading apps	5	11.4
Using mobile applications during their previous education		
Yes	31	70.5
No	13	29.5

*The participants reported more than one opinion.

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female and 68.2% are Anatolian high school graduates (Table 1). 63.6% of the students spend five hours and above on the internet. 100% of the participants use their smart phones to talk and use social media, 75% to read books, 72.7% to do their homework, 56.8% to watch movies, 56.8% to listen to music and 50% to watch videos. 100% of the students have Instagram, 100% WhatsApp, 100% YouTube, 59.1% game applications and 54.5% music applications on their smart phones. 95.5% of the students use their mobile phones everytime and everywhere and 70.5% had used mobile applications before their nursing education (Table 2).

Theme 1: The opinions towards the mobile application

The nursing students who participated in the study indicated that the mobile application prepared was appropriate for their level (20 participants, 45.5%), the mobile application was adequate (23 participants, 52.2%) and the colors of the mobile application were vivid and convenient (18 participants, 40.9%); whereas seven participants (15.9%) stated that the mobile application was too colorful. In addition, 11 (25%) stressed the necessity of notifications to remind to go online in the mobile application and 14 (31.8%) participants

Table 3: Experiences and views of the nursing students regarding the mobile application prepared for nurse education (n = 44).

Experiences and views regarding the mobile application	n	%
Thoughts about the mobile application prepared for skill teaching*		
Suitable for my level	20	45.5
Adequate	23	52.2
The colors of the mobile application were vivid and convenient	18	40.9
The mobile application was too colorful	7	15.9
Notifications reminding one to use mobile application should be added	11	25.0
Evaluation questions should be added	14	31.8
Aim of the using the mobile application*		
To learn the subject	40	90.9
To prepare to the exams	39	88.6
Before the training at the hospital	19	43.2
Before performing the application in the school's skill laboratory	16	36.4
To do practice	15	34.1
To be prepared for the course	11	25.0
Feelings before and during using the mobile application*		
Curious	33	75.0
Useful	14	31.8
Excited	10	22.7
Feeling special	9	20.5
Relaxed	10	22.7
Feeling happy	12	27.3
Having prejudices against the mobile application	5	11.4
Hesitant	3	6.8
Were any problems experienced while using the mobile application?		
Yes	40	90.9
No	4	9.1
Fellings when applying skills after using the mobile appication*		
Knowledgeable	40	90.9
Enough	28	63.6
More self-confidence	13	29.5
Less stressful	30	68.2
Suggestions about developing mobile applications used in nursing education*		
They should have reminder/alert systems	44	100.0
They should be supported by eveluation questions	44	100.0
They should be include more nursing topics (IM injection, IV injection etc.)	44	100.0

*The participant reported more than one opinion.

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mentioned the need for evaluation questions (Table 3). Some of the participants' views on their opinions about the mobile application prepared for nursing education are as follows:

"…it was easy to download for android phones… it was easier to use than I expected…the subjects were summarized and were appropriate for our level… videos in other subjects can be added…" **(P15, Age 19, Female, 2. Interview)**

"…there was no lack of theoretical knowledge, but I needed eye contact with a teacher…" **(P19, Age 20, Female, 3. Interview)**

"…the application was good. the book contained too much information about the subject… the mobile application, on the other hand, only contained information that we needed, which was good enough…" **(P34, Age 18, Female, 5. Interview).**

Theme 2: The aim of using the mobile application

In the study, it was determined that the students who were interviewed used the mobile application to learn the subject (40 participants, 90.9%), to prepare to the exams (39 participants, 88.6%), before the training at the hospital (19 participants, 43.2%), before performing the application in the school's skill laboratory (16 participants, 36.4%), to do practice (15 participants, 34.1%) and to be prepared for the course (11 participants, 25%) (Table 3). Some of the participants' views on their intended use of the mobile application prepared for nursing education are as follows;

"…I was using it very often at first… but it was more useful around the exam period…" **(P39, Age 18, Female, 6. Interview)**

"…at first, I used it very often to learn the subject… when I thought that I had learned, I began to use it less often… I checked it again and again around the exam period…" **(P41, Age 19, Female, 6. Interview)**

"…I used it before the training… I use it before the exams…" **(P28, Age 18, Female, 4. Interview.**

Theme 3: The emotions students felt in the mobile application process

The students who participated in the study indicated that they were curious (33 participants, 75%), thought that it would be useful (14 participants, 31.8%), were excited (10 participants, 22.7%), felt special (9 participants, 20.5%), were relaxed (10 participants, 22.7%) and felt happy (12 participants, 27.3%) before and while using the mobile application; whereas five participants (11.4%) stated that they had prejudices against the mobile application when they first heard it and three participants (6.8%) stated that they were hesitant that the application would take up too much space in their phones (Table 3). Some of the participants' views on their feelings about the mobile application prepared for nursing education are as follows;

"…it was really good to be able to attain the course subject outside course hours… it made me learn better… I got happy…" **(P3, Age 19, Female, 1. Interview)**

"…I liked that it was something new and I was also happy to learn new things… I had encountered such an application for the first time in my life…" **(P13, Age 19, Male, 2. Interview)**

"…I felt relieved… as the classroom was very crowded, I was too shy to ask questions… the application made me feel safe…" **(P19, Age 18, Female, 3. Interview)**

"…at first I thought it would not be effective at all… then I changed my mind… it increased my knowledge and skills…" **(P20, Age 20, Male, 4. Interview).**

Theme 4: The difficulties experienced in the mobile application process

40 of the participants (90.9%) had no problem with downloading the mobile application, having internet outages and running out of battery; whereas four participants (9.1%) stated that they had problems while downloading the mobile application and received support (Table 3). Some of the participants' views on their problems while downloading the mobile application prepared for nursing education are as follows;

"…it was really advantageous to use the application without internet…" **(P4, Age 19, Female, 1. Interview)**

"…I had a problem only while downloading it… I called my teacher and we downloaded it once again…" **(P24, Age 19, Female, 5. Interview).**

Theme 5: The benefits of the mobile application in nursing education

The students indicated that they had less stress (30 participants, 68.2%), felt enlightened (40 participants, 90.9%), felt competent on the subject (28 participants, 63.3%) and had more self-confidence (13 participants, 29.5%) while applying the skill after using the mobile application (Table 3). Some of the opinions of students towards the benefits of the mobile application in nursing education;

"…I followed the mobile application… although I missed the course while the subject was being taught, my knowledge still increased… I felt competent and had no stress at all…" **(P17, Age 21, Male, 3. Interview)**

"…I felt more enlightened and competent… I had less stress while using the application…" **(P40, Age 19, Female, 6. Interview)**

"…I had the chance to watch the video again and again, which reduced my stress… I felt enlightened and more confident… I had a feeling that I could do it…" **(P15, Age 19, Female, 3. Interview).**

Theme 6: The use of the mobile application in nursing education

All of the students who participated in the study indicated that it was necessary to use mobile applications in nursing education. In addition, they all stated that rather than alone, it would be more useful to perform the mobile application integratedly with expression, demonstration and laboratory applications used in nursing education (Table 3). Some of the opinions of participants towards the use of the mobile application in nursing education are as follows;

"…It would be good for all applied courses… we don't want to read the school boks... it is difficult to carry the books all the time... the mobile application would be good, because I have my phone with me all the time…" **(P17, Age 21, Male, 3. Interview)**

"…the mobile application should be downloaded before the theoretical course so that I can be prepared to the course... I can practise it whenever I wish to... there should be both the teacher and the mobile application… the classroom environment is good for me to learn… it is better in the classroom environment (jokes, laughters)…" **(P43, Age 19, Female, 6. Interview)**

"…the mobile application should be used in nursing education… videos are always more effective… first the teacher should teach and then we should practise on the application… it is better to watch videos at home…" **(P24, Age 19, Female, 4. Interview)**.

In addition, concerning the development of the mobile application; all of the students suggested that it was necessary to have a reminder notification/warning system, to support the mobile application with relevant evaluation questions and to prepare mobile applications for other nursing skills as well (Table 3). Some of the participants' suggestions for mobile applications to be prepared for nursing education are as follows;

"…the questions in the mobile application could be online… the teacher could evaluate us from there…" **(P11, Age 19, Male, 2. Interview)**

"…new subjects should be added… the videos should be uploaded in parallel with weekly subjects… we cannot see all the materials in the class… it should be supported with photos". **(P33, Age 19, Female, 5. Interview)**

"…the application should also be available for other skills... there should be questions with which we can test ourselves… there should be a reminder for certain times… the visual content can be enhanced…" **(P38, Age 18, Male, 6. Interview)**.

Discussion

The findings obtained as a result of the qualitative research which was conducted in order to determine the opinions and experiences of nursing students towards the use of the mobile application in nursing education were discussed in accordance with the literature.

As a result of the focus group interviews conducted in the study, it was revealed that more than half of the nursing students spent more than five hours on the internet on their mobile phones and used their phones to talk, socialize, have fun and do their homework. It was determined that all of the participants had mobile applications such as Instagram, WhatsApp and YouTube on their phones and almost all of them used their phones everytime and everywhere (Table 2). In the study conducted by Alsayed, et al. [9] with 135 nursing students in the literature, it was found that 92.6% of the students would certainly check their mobile phones first when they woke up in the morning, 94.8% before going to bed every night and 94.8% used their phones everywhere. In the study conducted by Damor, et al. [30] with medical students, it was determined that 99.7% of the students used mobile phones, 98.1% went online on their mobile phones and 53.6% spent 4-6 hours on the internet. In the same study, it was also found that 65.2% of the students used their phones to go online on social media. In the study conducted by Slaih, et al. [31] with 918 university students, it was seen that the participants spent more than five hours on the internet on average, 30.7% would check their phones every 20 minutes and nearly 21% would check them every 10 minutes once or more, 93.1% used their phones to talk, 90.1% to use social media, 81.3% to listen to music and 49.6% to play games. As is seen in this study and in other studies, the university students use their mobile phones for many purposes such as talking, socializing and having fun and spend most of their time using their phones within the day. Today, mobile phones have become a tool for every age group, especially the youth to socialize and have fun beyond communication. These findings indicate that mobile phones can be used as an educational instrument with the purpose of supporting the continuation of nursing education outside of school.

In the study, a part of the students stated that the mobile application prepared was appropriate for their level and the colors within the content of the mobile application were vivid and convenient; some of them complained that the mobile application was too colorful (Table 3). This situation signifies that it is important to prepare the mobile applications for nursing education according to the level of students and to take the opinions of students.

Regarding the contributions of the mobile application in nursing education; their decreased stress, increased knowledge, they felt more competent and confident (Table 3). In similar relevant studies conducted with nursing students using mobile applications and videos, it was seen that the students'

knowledge and skills increased [1,4,11,20-24]. Additionally, it was found that using mobile technologies in nursing education increased the students' self-competence [2,23-25], self-confidence [2,21,24], satisfaction [21,23], motivation [21], critical thinking [32] and communication [1,31] and reduced their stress [25]. Findings of the literature and this study emphasize that using mobile technologies in nursing education increases the students' knowledge, skills, motivation, self-confidence and self-competence and reduces their stress level. Thus, it is an inevitable fact that including mobile technologies in nursing education in the nursing curricula will make an important contribution to training qualified nurses of the future.

Concerning the using of the mobile application in nursing education; all of the students reported that it was necessary to have a reminder notification/warning system, to support the mobile application with relevant evaluation questions and to prepare mobile applications for other nursing topics as well (Table 3). In the focus group interviews conducted by Li, et al. [26] with 20 nursing students, the students offered that it was necessary to have a student response system and an online evaluation form for student - instructor interaction and to update the videos continuously. In the study conducted by Lee, et al. [21], Kang and Suh [24] concerning a mobile application that they developed for nursing students, the students reported that the mobile application was useful and it needed to be developed also in different subjects. As is known, it is very important to give the students feedback in nursing education for the students to evaluate themselves and to realize and correct their deficiencies.

All of the students who participated in the study indicated that it was necessary to use mobile applications in nursing education. In addition, they all stated that rather than alone, it would be more useful to perform the mobile application integratedly with expression, demonstration and laboratory applications used in nursing education (Table 3). Similarly in the study, the nursing students indicated that mobile applications should be added to the traditional education [6,11].

As is known, intraclass teaching enables face-to-face interaction between the instructor and student and gives the student to ask the instructor about unclear points and discuss them with her/him while lecturing. Also the demonstration method used in nursing education and laboratory courses where applications are performed on models help the students learn the better with seeing and practising. In nursing education, mobile technologies can be used both in in-classroom and out-of-classroom activities and students can maintain learning activities with mobile applications. Mobile technologies provide the opportunity to follow the games and view the simulations about course materials, current evidence, guidelines,

educational videos, and learning [33]. In addition to this; mobile applications, which can be easily used by the students anytime and anywhere without any time limitation, are very important up-to-date teaching strategies that increase the students' knowledge, self-competence, self-confidence and repetition of the subject and reduce their anxiety and stress. Furthermore, students can maintain learning activities independent from the instructor with their mobile phones by using mobile question-answer applications in which educational sharing and discussions are performed.

Conclusions

According to the results of this study, most of the 1st-grade nursing students spent on the internet on their mobile phones; mainly used their phones to talk, socialize, have fun and do their homework; had mobile applications such as Instagram, WhatsApp and YouTube on their phones; and almost all of them used their phones everytime and everywhere. In addition, it was seen that using the mobile application in nursing education increased the students' self-confidence and self-competence and reduced their stress. Besides, the students belive that it will be useful to use both standard teaching method in which the instructor lectures and relevant mobile applications together. In line with these results, it is believed that it will be useful to prepare mobile applications in nursing education, integrate these mobile applications into standard education and revise the curricula accordingly. Furthermore, the results of this study reflect the opinions of first-grade nursing students. Thus, it is suggested to conduct qualitative and quantitative studies on the use of mobile applications in nursing education with nursing students in upper grades.

Authorship Statement

AKV and MSB design of the study, data collection, analysis, interpretation of data, manuscript drafting and revising. All authors read and approved the final manuscript to be published.

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