



The effects of using the nurse self-concept mobile application on the retention of nursing students

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Abstract:

BACKGROUND: The high dropout rate among nursing students has become a global concern as it leads to a shortage of nurses on the one hand and a negative impact on the professional motivation of nursing students on the other. The present study was conducted to investigate the effects of using the Nurse Self-Concept Mobile Application (NSCMA) on the retention of nursing students.

MATERIALS AND METHODS: The present study is an experimental work of research with a longitudinal design conducted from April to December 2021. The study population was second-year nursing students in a nursing school in the south of Iran who were randomly divided into an experimental ($n = 49$) and a control group ($n = 50$). The assessment was based on a pretest–posttest design and a one-month follow-up. The collected data were analyzed in SPSS v. 21 using descriptive statistics (frequency, percentage, mean, and standard deviation) and analytical statistics (repeated measures). The P value was set <0.05 .

RESULTS: The means of the students' ages and grades were 21.31 ± 2.43 and 15.30 ± 2.13 , respectively. The results showed a statistically significant increase in the experimental group's intent-to-stay mean scores as measured in three stages ($P = 0.029$), indicating that the intervention enhanced the nursing students' inclination to stay in nursing programs. However, the changes in the control group's mean scores were not statistically significant ($P = 0.132$).

CONCLUSION: The Nurse Self-Concept Mobile Application proved effective in enhancing nursing students' inclination to complete their education and follow a career as a nurse. Thus, it is essential that nursing students' education include programs designed to enhance the students' self-concept, especially in the first few years of their education. Also, nursing schools should use this software to encourage students to stay in the nursing major.

Keywords:

Attrition, mobile application, nursing students, retention, self-concept

Introduction

Dropping out is defined as quitting one's education before one has successfully completed a school or college program.^[1] The students who enter the field of nursing come from diverse social, economic, and educational backgrounds. For half a century, retention of these students has been a challenge.^[2]

However, dropout is a common problem in nursing education.^[3] The high dropout rate among nursing students has become a global concern as it results in not only a shortage of nurses but a negative impact on the professional motivation of nursing students.^[4] The percentages of nursing students leaving their program before graduation vary between countries, for example, 9% in Finland, 5 to 40% in England, 10 to 40% in Canada, and up to 40% in

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Australia.^[5] In Italy and the Netherlands, the nursing students' dropout rates were 35–37% and 20.5–21.1%, respectively.^[6,7] A little information is available regarding the dropout rate of nursing students in Iran. In a study, dropping out was most frequent in medical students (45.3%) and nursing students (17.3%).^[8] In other studies, nursing students' dropout was reported the 10.5–16.9%.^[9,10]

The students who dropout of nursing school may have experienced a problem in their personal, social, or financial lives.^[10] Dropout from nursing education shows a loss of human capital as well as financial capital and is especially problematic considering the severe shortage of nursing staff.^[11] The current dropout rate has inflicted a financial burden on universities.^[12] and adversely affected the quality of healthcare services in societies.^[1] In addition, academic failure and dropping out can cause some challenges for the students themselves such as increasing the chances of drug abuse and alcohol addiction.^[13]

A variety of factors can contribute to nursing students' failure.^[14] Many nursing students quit their studies because of psychosocial issues, including a poor self-concept or unsatisfactory evaluation of oneself.^[15] New nursing students' expectations of their courses and the nursing profession are often not fulfilled by what they experience in their education and clinical environments, causing them to lose their internal and external motivations in learning or professional environments, which can, in turn, lead to despair, dissatisfaction, and eventually, a decision to quit.^[10] Professional self-concept and self-efficacy are closely related, which are necessary to adapt to the environment. Improvement of these constructs will promote psychological well-being and can affect students' educational outcomes.^[16]

Many nursing schools use face-to-face or group programs to increase students' motivation and reduce the dropout rate. In one study, group learning methods, the introduction of students to the nursing curriculum, personal schedules for studying, consultation about the nursing career, peer learning, and mentors were used as official sources of psycho-emotional support for nursing students.^[17] The result of a study showed that 1–3 months after the educational workshop, the score of the nurses' self-efficacy increased.^[18] Other studies have assessed the effectiveness of different methods of supporting nursing students in retaining them; these methods address a wide range of nursing students' academic and personal issues.^[19,20] However, awareness of nursing students' psychological needs is essential to retaining them.^[21] The developers and executors of nursing curricula have focused on improving nursing students' cognitive and clinical skills and have not paid

sufficient heed to these students' emotional needs in their courses.^[22]

Professional self-concept is considered a key factor in improving the various aspects of nursing,^[23] and enhancement of this quality is stressed as a major goal of nurses' education and mental health all over the world.^[24] Professional self-concept describes nurses' mental experience of perceiving and thinking about their role as nurses.^[25] In other words, it refers to nurses' perception of the quality of their adjustment to their professional roles and expectations of them.^[26] According to a study by Shengxiao *et al.*^[27] (2021), there is a direct correlation between professional identity and retention of students in nursing programs and intent to leave: the nursing students who were inclined to stay in nursing had a higher professional identity mean score than the students who were inclined to dropout.

A powerful nurse self-concept can alleviate the stressful effects of working in a clinical environment,^[28] and help nursing students have a better perception of their clinical practice.^[29] A positive professional self-concept can significantly increase an individual's productivity in the profession of his/her choice and, consequently, results in higher job satisfaction.^[26] Yet, a review of the literature shows that the effects of professional self-concept training on nursing students' dropout rates have not been investigated so far. In addition, most of the available research has been conducted in western countries, which are culturally and socially different from Eastern countries. Cultural and social contexts can affect nursing students' professional self-concept and their intent to stay.^[30] It is, therefore, necessary that nursing students' professional self-concepts be evaluated in different contexts. Also, the studies conducted in Iran in this area are correlational and descriptive works of research and the researchers did not find any experimental studies.

In view of the popularity of smartphones in societies today, educators have become increasingly interested in learning via mobile phones and using smartphones as an educational tool.^[31] As a subcategory of electronic learning, mobile learning is an effective tool to meet students' educational needs and is commonly employed in higher education.^[32] Smartphones allow educators to provide rich, interactive, multimedia education based on learning objectives.^[33] Recent research findings show that smartphone-based educational interventions contribute to nursing students' satisfaction, self-confidence, self-efficacy, clinical reasoning, and clinical skills.^[34] Yet, in most studies, smartphone-based interventions were used to enhance nursing students' theoretical knowledge, clinical competence, and trust.^[33] For example, a study reports that inexperienced nurses could manage nursing care for the injured by using the simulated

scenario.^[35] Even though the increase in the number of nursing students who drop out of school is an issue of global proportions, the effects of a smartphone-based intervention on the retention of nursing students have not been investigated so far. It is hoped that the results of this study will help educational managers in providing a supportive strategy while maintaining the self-concept of nursing students, and subsequently promoting stay in the nursing major. Accordingly, the aim of the present study was to identify the effects of using the Nurse Self-Concept Mobile Application on nursing students' intent to stay.

Materials and Methods

Study design and setting

This is an experimental study that was conducted at the nursing school of Jahrom University of Medical Sciences from April to December 2021. This nursing school is one of the largest colleges in the south of Iran. The study used a longitudinal design to evaluate the effects of an intervention, Nurse Self-Concept Mobile Application (NSCMA), on second-year nursing students' intent to stay. The study population was randomly divided into an experimental and a control group and subject to pretest and posttest evaluation.

The experimental group used NSCMA for four consecutive weeks. The control group only received their routine education at school. Both groups were evaluated before, immediately after, and one month after the intervention.

Study participants and sampling

To avoid the exposure of the students in the control group to the content of the educational intervention, the researchers placed the second-year students (50) from the first semester of 2021 in the control group and the second-year students (49) from the second semester of 2021 in the experimental group. At the beginning of the semester, in an introduction session, the students were provided with the necessary information about the study. The inclusion criteria were being willing to participate and possessing a smartphone. The students who did not complete the questionnaires fully or were not willing to continue cooperation at any point in the courses of the research were excluded.

The intervention employed NSCMA, an easy-to-use application developed based on needs assessment, feedback from experts, and relevant articles and books. The researchers checked the students' use of the application for four consecutive weeks via the social network WhatsApp and encouraged the students to engage in group discussions and interaction under the researchers' supervision on WhatsApp. All the

students in the experimental and control groups completed the Nurse Retention Index (NRI) scale in the pretest (before the intervention using NSCMA) and posttest (immediately after the intervention and after the four-week monitoring) stages.

Data collection tools and technique

Data were collected using the Nurse Retention Index (NRI) scale, which measures the respondents' intent to stay in nursing or quit in order to find another occupation. The scale consists of six items, four of which are affirmative statements and two are negative. Each item is scored on a Likert scale, ranging from 1 to 8. The negative items are reverse-scored in statistical analysis. The score range is from 8 to 48, with higher scores indicating greater intent to stay in nursing. In a pilot sample, the reliability of NRI was assessed and verified by a Cronbach's alpha of 0.80. The reliability of NRI was checked by 30 third-year nursing students who are not among the sample of the present study.

Nurse self-concept mobile application

NSCMA is a tool designed to improve nursing students' understanding of the field of nursing and their self-concept as nurses. The topics addressed by this application consist of an introduction to professional ethics and professional autonomy in nursing, training in developing life skills, e.g. self-confidence, stress management and coping, promoting critical thinking and communication skills, and training in the administrative skills needed in nursing, e.g. the ability to work as part of a team, self-regulation, and leadership. The education was provided through videos, images, audio files, and texts to the nursing students. The collected data were analyzed in SPSS v. 21 using descriptive statistics (frequency, percentage, mean, and standard deviation) and analytical statistics (repeated measures).

Ethics consideration

This study was conducted in accordance with the World Medical Association's Declaration of Helsinki. The study has been approved by the ethics committee at Jahrom University of Medical Sciences (ethics code: IR. JUMS. REC.1399.158). In accordance with the principles of research ethics, before collecting data, the researchers informed the participants about the objectives of the study, the voluntary basis of participation, and the role of the researchers and acquired the participants' informed consent. The participants were also assured that all information would remain confidential and the results would be presented anonymously. The subjects who were willing to participate were asked to complete the informed consent form by Porsline. The participants were also informed that they were free to withdraw from the study at any point.

Results

The demographic variables of the nursing students in the experimental and control groups are shown separately in Table 1. The means of the students' ages and grades were 21.31 ± 2.43 and 15.30 ± 2.13 , respectively. 54.5% of the students were female and 52.5% were natives. The results showed that there were no statistically significant differences between the two study groups in terms of average age, average grade, gender, and place of residence.

According to the results of the independent *t* test, in the pretest stage, there was not a statistically significant difference between the two groups' intent-to-stay mean scores ($P = 0.942$). However, the results showed a statistically significant difference between the two groups' intent-to-stay mean scores as measured immediately after the intervention ($P < 0.001$) and one month after the intervention ($P = 0.001$). The results of the repeated measures ANOVA showed statistically significant differences between the experimental group's intent-to-stay mean scores as measured three times in the course of the study ($P = 0.029$), indicating that the intervention increased the students' intent to stay in nursing. As for the control group, however, the differences were not statistically significant ($P = 0.132$) [Table 2].

Table 1: The demographic variables of the experimental and control groups

Group (n)		Experimental (49 students)	Control (50 students)	P
Variable		M±SD	M±SD	
Age		21.30±2.71	21.32±2.16	$\alpha=0.978$
Average grade		15.40±2.48	15.21±1.75	$\alpha=0.664$
		n (%)	n (%)	
Gender	Female	26 (53.1%)	28 (56.0%)	b=0.769
	Male	23 (46.9%)	22 (44.0%)	
Place of residence	Native	27 (56.3%)	25 (51.0%)	b=0.489
	Non-native	20 (41.7%)	24 (49.0%)	

α =independent *t*-test b=Chi-square test

Table 2: A comparison between the experimental and control groups' intent-to-stay mean scores

Time	Before intervention (T1)	Immediately after intervention (T2)	One month after intervention (T3)	Repeated measures ANOVA per group	Repeated measures ANOVA between the two groups
Group	M±SD	M±SD	M±SD		
Experimental (49 students)	4.93±0.88	5.38±0.91	5.26±0.93	$F=4.901$ $df=2$ $P=0.029^b$	$F=10.566$ $df=1$ $P=0.002^b$
Control (50 students)	4.91±1.18	4.61±1.19	4.54±1.19	$F=2.346$ $df=2$ $P=0.132^b$	
	$t=0.942$ $df=2$ $P=0.942^a$	$t=0.942$ $df=2$ $P<0.001^a$	$t=0.942$ $df=2$ $P=0.001^a$		

a=independent *t*-test b=repeated measures ANOVA

The Bonferroni test results showed that the difference between the experimental group's intent-to-stay mean scores as measured before and immediately after the intervention was significant ($P = 0.046$); there was also a significant difference between their mean scores as measured immediately after and one month after the intervention ($P = 0.004$) ($P < 0.001$). However, the difference between the experimental group's intent-to-stay mean scores as measured before and one month after the intervention was not statistically significant ($P = 0.231$). These findings show that the intervention increased the students' intent to stay in nursing immediately after the intervention, but its impact diminished six weeks after the intervention [Figure 1].

Discussion

The results of the present study demonstrate that the professional self-concept intervention executed via smartphones increased the nursing students' intent to

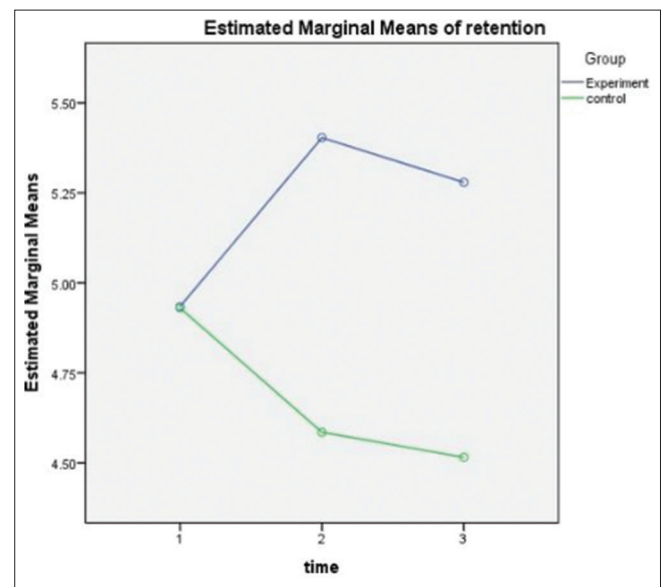


Figure 1: The comparison between students' intent to stay in nursing immediately and four weeks after intervention

stay in nursing: there was a significant increase in the students' intent-to-stay mean scores immediately after the intervention. An extensive review of the literature showed that the effects of a Nurse Self-Concept Mobile Application on the retention of nursing students' in nursing had not been studied before. Accordingly, the researchers cited studies that had addressed the effects of face-to-face education or only one of the variables measured in the present study.

Several studies have reported a significant positive correlation between professional self-concept and self-confidence in nurses.^[26] The results of a study by Sabancio Clari and Doğan (2017) showed that nurses' professional self-concept was influenced by their personal characteristics and working conditions. The nurses with more professional experience and administrative responsibilities had significantly higher professional self-concept scores.^[36] In a study by Mohajer *et al.*^[37] (2021), among the dimensions of professional self-concept, the highest mean score was for the nurses' communication and the lowest mean score was for their self-confidence. According to another study, nurses who have a positive perception of their profession are more prepared to accept responsibilities in their job.^[38] Thus, it appears that interventions designed to develop nursing students' communication skills and self-confidence can improve their professional self-concept and increase their intent to stay. Glossop maintains that many students today see nursing as a low-income profession with difficult working conditions, which reduces interest in this profession.^[39] Awareness of the realities of one's profession can help one adapt more easily and find better solutions for the problems he/she faces on the job. Otherwise, when problems come up, one is likely to feel hesitant about staying. A positive perception of one's profession results in better mental preparation for accepting responsibilities; in the absence of a positive perception, one feels frustrated and unable to perform any tasks successfully.^[5,40] These results are useful for planning some strategies and programs for improving professional self-concept in nursing students. Nursing policymakers should be considering many factors in management planning such as educational workshops about improving the perception of one's profession, developing communication skills, and self-confidence. Considering the above factors in educational, supportive, and recreational programs can increase nursing students' self-concept and subsequently decrease their dropout.

Several studies have evaluated the effectiveness of certain interventions in contributing to the retention of nursing students in nursing. According to one study, professional self-concept awareness strategies can increase nursing students' intent to stay.^[41] Encouraging nursing students to share their experiences with their

peers improves their professional self-concept and management and teamwork skills.^[42] In a study by Brook *et al.*^[43] (2021), a four-day intervention consisting of training in acceptance of and commitment to clinical duties, time management, development of social assets through new nurses, assertiveness and coping strategies, stress management, and discussion of performance issues increased the nursing students' tension and enhanced their self-efficacy. These positive outcomes were reported to help the retention of nurses and nursing students. In another study, participation of the nursing students in international conventions and professional social activities proved to be effective in increasing the students' commitment to nursing.^[44] Another study evaluated the effects of a virtual network on Instagram intended to develop nurses' communication skills and found that the intervention improved the personnel's interaction and intent to stay.^[45] In a study by Igbo *et al.*^[46] (2011), the strategies employed to increase retention of students in the nursing schools of Texas included preparing students for lectures, training in note-taking skills, promoting critical thinking, training in exam techniques, developing communication skills, introduction to medical terms, career coaching, and socializing. The participation of the students and faculty members was the key to the success of the intervention. These findings underscore the significance of developing plans to enhance nursing students' self-esteem and professional self-concept, which will in turn reduce their intent to leave.^[36,47] If these measures result in the systematic professional development of nursing students and present nursing as an independent profession that requires great knowledge and skills, they can improve nurses' and nursing students' professional self-concept and inclination to stay in nursing. Also, more attention to the factors related to developing professional self-concept and learning environment can prevent students' dropout, in addition to preventing loss of resources and contribute to improving a more effective educational system.

In a study by Ribeiro *et al.*^[48] (2020), which was conducted to evaluate the effects of nursing interventions via Facebook on nursing students' self-esteem and self-efficacy, the nursing students received 10 sessions of educational interventions which included positive messages, reflection quotes, and reflection images developed using motivational learning resources from Bandura's theoretical framework. The results showed that the intervention contributed to the nursing students' self-esteem and self-efficacy. Other studies have similarly verified the positive impact of interventions based on digital technology on students' mental states, including anxiety, depression, stress, self-esteem, and self-efficacy and showed that online interventions can improve emotional indexes.^[49,50] Other studies have found that

mobile learning results in better communication skills and clinical reasoning skills.^[33] It appears that mobile learning improves medical students' clinical competence and confidence and encourages them to acquire theoretical knowledge.

Research shows that smartphone-based mobile learning enhances the learners' knowledge, skills, and confidence in their performance, improves their attitude toward learning, and facilitates self-regulation. Mobile learning also encourages active learning, increases students' motivation, and improves cooperation and interaction between students.^[51,52] According to another study, access to medical information enhances medical students' self-efficacy.^[53] In a study by Choi *et al.*^[54] (2015), second-year nursing students were trained in communication skills via smartphones. The results showed a significant increase in the communication competence and emotional intelligence of the students in the experimental group. In a study by Li *et al.*^[55] (2018), the students who had been trained in communication skills via smartphones acquired high levels of motivation and performance. The students' and teachers' ability to share information, files, and messages with each other through mobile technology promoted student-teacher and student-student interactions. These findings reflect the characteristics of smartphone^[56] learning with which nursing students can find interesting and be motivated to pursue. By using mobile devices, nursing students can be motivated to learn because they are familiar with the device and can learn anywhere at any time.

In the present study, the intervention increased the students' intent-to-stay mean scores immediately after the intervention, but its impact was found to have diminished six weeks after the intervention. It can be concluded that nursing students need training in professional self-concept for periods exceeding four weeks. It seems that smartphone-based mobile learning facilitates self-directed learning and allows learners to have frequent access to information by removing time and space limits. Many students are exposed to tension in their theoretical and practical courses in laboratories or hospitals, while learning via smartphones gives students the chance to enjoy a learning environment where they are not judged and can work without fear of making medical errors.^[33] All of the above can contribute to students' professional self-confidence and intent to stay. Smartphone use in nursing education allowed nursing students to feel empowered to care for patients. In this sense, smartphones may motivate nursing students by increasing self-confidence and clinical efficacy, and increasing their intention to stay in the profession.

A strength of the present study was the innovation in the education of Nurse Self-Concept for the nursing

students during the COVID-19 pandemic. Implementing the NSCMA during the pandemic minimized the nursing students' and instructors' face-to-face visits and consequently, reduced the risk of the spread of the viral infection among them. One of the limitations of the present study is that the study population consisted exclusively of nursing students in the second semester. Second, this study was conducted in one college in Iran. Therefore, it is suggested that future research addresses a more diverse group of students with different experiences and perceptions of professional self-concept so that more accurate results can be obtained about the effectiveness of the software in question in increasing nursing students' intent to stay.

Conclusion

The professional self-concept intervention, which consisted of training in ethics and professional autonomy, life skills, communication skills, teamwork skills, self-regulation, and leadership through smartphones, proved effective in increasing the nursing students' intent to stay. Accordingly, it is recommended that nursing schools use this software as a tool to encourage students to stay in the field of nursing.

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Conflicts of interest

There are no conflicts of interest.

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