ผลของการใช้แอพพลิเคชั่นหนังสือการพยาบาลเพื่อเตรียมความพร้อมก่อนขึ้นฝึกปฏิบัติการพยาบาลของนักศึกษาพยาบาลในสถาบันการศึกษาพยาบาลแห่งหนึ่ง*

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บทคัดย่อ

การใช้เทคโนโลยีการเรียนรู้ผ่านมือถือ เพื่อส่งเสริมผลลัพธ์ในการเรียนรู้การฝึกปฏิบัติพยาบาลผู้ใหญ่ยังคงเป็นประเด็นที่ไม่ได้รับการศึกษาอย่างเพียงพอ การศึกษานี้มีวัตถุประสงค์ เพื่อประเมินความเป็นไปได้ในการใช้งานแอพพลิเคชั่นหนังสือพยาบาล (NB app) สำหรับนักศึกษาพยาบาลในสถาบันการศึกษาพยาบาลแห่งหนึ่ง โดยใช้วิธีการวิจัยแบบผสมผสาน การเก็บข้อมูลเชิงปริมาณโดยใช้แบบสอบถามและวิเคราะห์ข้อมูลโดยใช้สถิติเชิงพรรณนา สำหรับข้อมูลเชิงคุณภาพเก็บข้อมูลโดยใช้การสนทนากลุ่ม และวิเคราะห์ข้อมูลโดยใช้การวิเคราะห์แก่นสาระ ผลการศึกษาจากการใช้แบบสอบถามนักศึกษาพยาบาล จำนวน 22 คน พบว่ากลุ่มตัวอย่างมีการรับรู้ในภาพรวมต่อผลลัพธ์การเรียนรู้ ความมีประโยชน์ และความพึงพอใจ มีค่าเฉลี่ยเท่ากับ 3.81 (SD=0.82) นอกจากนี้ ข้อมูลที่ได้จากการสนทนากลุ่ม ซึ่งประกอบด้วย ผู้เข้าร่วม จำนวน 8 คน พบว่า NB app ใช้ง่าย มีข้อจำกัดการใช้เฉพาะมือถือระบบปฏิบัติการ

สรุปว่า แอปพลิเคชันช่วยในการเตรียมตัว สำหรับการฝึกปฏิบัติพยาบาลผู้ใหญ่ได้อย่างมีประสิทธิภาพ ข้อเสนอแนะ สำหรับการวิจัยในอนาคตควรมุ่งเน้นการตรวจสอบประสิทธิผลของแอปพลิเคชันโดยการใช้การวิจัยเชิงทดลองแบบสุ่มที่มีกลุ่มควบคุม เพื่อศึกษาถึงผลลัพธ์ของการเรียนรู้เพิ่มเติม

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Effectiveness of using nursing book application for preparing clinical practice among nursing students in a university*

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Abstract

The use of mobile learning technology to enhance learning outcomes in adult nursing practice remains insufficiently studied. This study aimed to assess the feasibility of using the Nursing Book Application (NB app) among nursing students at a nursing education institution. A mixed-methods research approach was employed. Quantitative data were collected through questionnaires and analyzed using descriptive statistics, while qualitative data were gathered through focus group discussions and analyzed using thematic analysis. Findings from the questionnaire, completed by 22 nursing students, indicated that their overall perceptions of learning outcomes, usefulness, and satisfaction had a mean score of 3.81 (SD=0.82). Additionally, data from a focus group discussion with eight participants revealed that the NB app was easy to use, but its functionality was limited to Android devices.

In conclusion, the application effectively supported nursing students in preparing for adult nursing practice. Future research should focus on evaluating the app's effectiveness using a randomized controlled trial to further explore its impact on learning outcomes.

keywords: clinical practice; clinical learning; mobile learning; nurse education; mobile application

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Introduction

Preparing clinical practice is the crucial goal of a nursing baccalaureate curriculum. For practicing in the complex healthcare environment in a hospital setting, nursing students are prepared with fundamental skills for maintaining the quality and safety of patient care[1]. Also, they will be assessed in clinical learning contexts in which they apply their knowledge and skills to care delivery[2]. A previous study acknowledged that teaching and learning components were essential to the clinical learning environment[2]. They also indicated that foundational nursing knowledge impacts clinical learning environment experiences; thus, nurse educators must ensure that students are prepared when providing clinical learning opportunities. Better preparedness in undergraduate education programs for nursing students before graduating affected their self-confidence and preparedness for practice[2-3]. That will be the success in transitioning from a student nurse to a registered nurse role[4].

Due to its importance, several studies show some strategic directions and programs regarding nursing learning environments to enhance skill competencies among nursing students. Peer learning in clinical practice education was used, which is nursing students working with each other in pairs to share, discuss, and reflect on knowledge and skills during clinical practice[5]. A previous study found that peer learning improved the self-efficacy of nursing students whose first clinical practice was at a university in Sweden[5]. However, they pointed out that peer learning did not improve self-rated performance. Moreover, some researchers pointed out that problem-based learning supports nursing students to be active learners and enhance clinical nursing skills. A qualitative study in South Africa revealed that problem-based learning is beneficial; however, there is still no compelling evidence that it can be used as a stand-alone teaching strategy[6]. A recent study integrated peer learning activity and problem-based learning in clinical nursing education in Indonesia[7]. The result showed that both strategies could improve clinical learning outcomes such as communication and understanding, nursing care, examination and treatment, and professional approach. Lastly, the application of mobile technologies in nursing education has increased in the past decades, and most of these studies focused on fundamental knowledge and clinical skill improvement[8].

Mobile learning is widespread in nursing education[8-9]. Various strengths of mobile learning were reported, such as no time or space limitations, quick access to learning materials, and self-directed study[9]. A study reported that most undergraduate nursing students in the United Kingdom used smartphones and mobile applications for searching and learning in clinical practice, including calculators, drug reference guides, and medical dictionaries[10]. Also, this study reported that nursing students perceived many benefits of educational apps, such as easy access to educational resources, enhanced knowledge and confidence in clinical practice, and decreased anxiety while learning clinical practice[10]. Similarly, a randomized controlled trial pointed out that mobile-based video clips were helpful educational material that improved clinical skills and enhanced learning, including attention, relevance, confidence,

and satisfaction among student nurses in South Korea[3]. Although evidence indicates that mobile technologies have increased clinical learning outcomes among undergraduate nursing students, studies examining mobile learning in nursing education are limited[9].

Clinical practice is a crucial phase for nursing students, particularly second-year students enrolled in Practicum in Adult Nursing I, as they begin their first clinical placements in hospital wards. However, many students face challenges such as anxiety, lack of confidence in patient care, inadequate clinical skills, and difficulty adapting to the clinical environment, all of which may affect their learning outcomes and readiness for nursing practice[11-12]. Several factors influence students' preparedness, including their theoretical knowledge, pre-clinical skills training, attitudes toward learning, faculty support, and prior clinical exposure[13]. In this course, pre-clinical preparation is limited to skill practice in laboratory settings and textbook reading, which restricts students' access to diverse learning resources and contributes to heightened anxiety. Integrating mobile learning technology to promote active learning may serve as an effective strategy to enhance students' clinical readiness and reduce pre-clinical stress, ultimately improving their confidence and competence in real-world patient care[14].

In Thailand, using mobile technologies to enhance clinical learning outcomes appears challenging. A study found that the level of readiness for self-directed learning among nursing students in Thailand was high[15]. However, studies have yet to report the result regarding self-directed learning outcomes, especially in clinical practices in nursing education via mobile technologies. A study suggested that nurse educators consider applying mobile technologies in training several skills. Before developing a mobile application, the researchers surveyed the strategies to prepare knowledge and skills for providing care in a hospital among nursing students. The results showed they need online clinical and practice knowledge via mobile technology for self-learning. Then, the Nursing Book Application (NB app) was developed by fourth-year undergraduate nursing students in the nursing innovation subject at one university in Northeast Thailand. The implementation outcome - feasibility needs to describe after adopting the intervention is carried out in a particular setting in terms of practicality, precise fit, utility, and trialability[16]. Thus, this pilot study explored how nursing students perceive the practicalities of implementing the mobile application for principles and techniques in a nursing practicum in adult wards.

Research Aim

This study aims to explore the experiences and perceptions of second-year baccalaureate nursing students regarding the feasibility of the NB app in preparing them for adult nursing practice.

Research Objectives

The objectives of this study are to:

1. Investigate students' perceptions of the NB app's impact on their learning, usefulness, and satisfaction with the adult nursing practicum.

2. Assess students' satisfaction with using the NB app during their adult nursing practicum.

3. Explore students' overall experiences and perceptions of integrating the NB app into adult nursing practice preparation.

Research Questions

The following research questions underpin the study:

1. What is the perception of the impact of the NB app on learning, usefulness, and satisfaction with adult nursing practicum?

2. What is the satisfaction of using the NB app for adult nursing practicum among second-year baccalaureate nursing students?

3. What are the experiences and perceptions of second-year baccalaureate nursing students regarding the feasibility of the NB app in preparing them for adult nursing practice?

Methods

Design

The mixed-methods approach has been described as the "third methodological movement," following the development of quantitative and qualitative research. It is recognized as the third research paradigm, providing a philosophical and theoretical framework that integrates both quantitative and qualitative research methods within a single study[17]. This approach enables a more comprehensive understanding of a research problem by combining numerical data with descriptive insights. Mixed methods design incorporates at least one quantitative method (designed to collect numerical data) and one qualitative method (designed to collect textual or narrative data). Importantly, neither method is inherently tied to a specific philosophical paradigm, allowing for flexibility in research inquiry[18].

In this study, a convergent mixed-methods approach was employed to gain a deeper understanding of the experiences and perceptions of second-year baccalaureate nursing students regarding the feasibility of the NB app in preparing them for adult nursing practice. The quantitative design was used to address Research Questions 1 and 2, while the qualitative design was applied to answer Research Question 3. In the quantitative component, a survey was conducted to assess students' perceptions and satisfaction after using the application, enabling the collection of numerical data to identify patterns and trends. Concurrently, in the qualitative component, a focus group was conducted to explore participants' experiences with the feasibility and perceived impact of the mobile application for clinical practice learning,

providing an in-depth understanding of students' perspectives[18]. Quantitative data from the survey and qualitative data from the focus group were separately collected and analyzed, following the convergent parallel design, in which both types of data are given equal priority and integrated during the discussion phase to provide a more holistic interpretation of the findings[18].

Participants and Setting

The study was conducted in a faculty of nursing at a university in northeast Thailand. The population comprised 63 second-year baccalaureate nursing students who enrolled in the practicum in adult nursing I recruited from March to April 2019. Purposive sampling was employed to select the participants. Nursing students were eligible if they (1) enrolled in the practicum in adult nursing I, (2) used mobile with an Android system, and (3) were willing to download and use the NB app. Nursing students were excluded from participating if they could not use the NB app during the research implementation.

To recruit participants, information about the research was provided during the orientation class. All students were given an information sheet detailing the purpose, procedures, and requirements of the study. Students who expressed interest in participating were provided with an informed consent form to review and sign. After consenting to participate, the students were instructed to download the NB app, which they used as part of the research during their practicum.

For the quantitative component, out of the 63 nursing students enrolled in the adult nursing practicum subject, 22 volunteers completed the survey. The remaining 41 did not participate in the survey due to using iOS mobile devices. After using the NB app, eight of the 22 students participated in the focus group, which is the qualitative component.

Intervention

The NB app was implemented in this study. This application is the program that installs the Android system device. The app functions as a digital textbook, containing comprehensive content on adult nursing subjects. It covers the principles and practices required to provide nursing care for adult patients in hospital settings. The NB app is structured into 11 chapters, including topics such as neurological, musculoskeletal, and gastrointestinal conditions, as well as procedures like catheterization and urostomy care. The content was reviewed and validated by three academic experts in adult nursing to ensure its accuracy and relevance. The application was co-designed and co-developed by fourth-year nursing students and an information technology engineer. The application feature provided each chapter separately that participants can directly read in the application or download PDF files. Participants downloaded the application by searching for its name and self-learned it for eight weeks during the intervention. Participants can access the application for self-learning whenever they want.

Figure 1 User interface of the nursing book application.

Data Collection

After the study had been approved for exemption, the data were collected. Next, researchers introduced the research project to second-year baccalaureate nursing students in the orientation section of the practicum in adult nursing I. All potential participants gained the research information and had opportunities to ask for further information from the research team. Then, all volunteered participants completed written informed consent. Finally, the researchers explained how to download and use the nursing book app for the participants.

Quantitative data

At the end of the eight weeks after adopting the application, the participants were invited to complete the survey. The survey comprised two parts, including the demographic data questionnaires and the perception and satisfaction of the NB app questionnaires. The first part collected personal information as follows: gender, the experience of adult nursing practice in the surgical ward and medical ward, frequency of use, and duration of use per time. The second part of the survey comprised a series of self-reported questionnaires. Two instruments used in this study were:

1) Researchers modified the Nursing Book Application Perception Questionnaire from the Thai Perception Questionnaire[19]. The reliability of the original version for the overall items was excellent (α=.88). For this study, researchers modified the questionnaire that measured the simulation of computer-based learning for use in the nursing field as the Nursing Book Application Perception Questionnaire. It has been divided into three subscales with a 16-item questionnaire regarding perceived knowledge (3 items), perceived usefulness (2 items), and perceived satisfaction (11 items). Items were scored on a five-point Likert scale (from 1=strongly disagree to 5=strongly agree). Three academic experts in the nursing field determined content validity (CVI) was .92.

2) The researcher team developed the Nursing Book Application Satisfaction Questionnaire. It has three subscales with a 13-item questionnaire: application format satisfaction (8 items), contents within the application (3 items), and contents within the E-book or PDF files (2 items). Items are measured on a five-point Likert scale (from 1=strongly disagree to 5=strongly agree). The scale was determined to have good construct validity by three educators in adult nursing, with a CVI value of 1.00, indicating the perfect appropriateness of the instrument's content.

Qualitative data

The focus group was conducted by two lecturers from the adult nursing department who were not members of the research team. Both hold PhDs in nursing and have experience conducting focus groups and qualitative research. The six-questionnaire guide for the focus group to explore the feasibility of the NB app was developed by researchers. The question example was, "Does the NB app help you to prepare the knowledge and skills for practicing in the adult nursing ward?". The questionnaire was validated by three academic experts in fundamental and adult nursing from the Faculty of Nursing, the same faculty as the sample population. It achieved a CVI value of .89, indicating the appropriateness of the instrument's content. The focus group was conducted in the conference room for 1 hr. The interview was directly recorded after the participant's consent, and then it was transcribed for data analysis by a researcher (SU).

Data analysis

The quantitative data from the survey were extracted into Excel and then transferred to SPSS for analysis using descriptive statistics, including frequencies, percentages, means, and standard deviations. For the qualitative data, a thematic analysis approach was employed to analyze the data collected from the focus group[20]. This method is both flexible and robust, enabling the identification, analysis, and interpretation of patterns within qualitative data[21]. In this study, the recorded focus group was transcribed for data analysis by a researcher (SU). The thematic analysis followed six steps: familiarizing with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the final report by two researchers (SU, BS)[20].

Ethical consideration

The human research ethics committees at the Faculty of Nursing, Khon Kaen University, approved this study (CR-0160). Participants were provided with research information and that they could withdraw from the study at any point without affecting their studying. Participant information was stored confidentially and will be permanently deleted from our records at the end of the study.

Results

Twenty-two nursing students consented to take part in the survey, and there were 14 females and eight males. Eight of them participated in the focus group session. All participants have experienced clinical practice in both surgical and medical wards.

Nursing Book Application Perceptions and Satisfactions

The level of perception and satisfaction with using the NB app is illustrated in Table 1. The mean score for the overall perception of using the mobile application for nursing practicum was 3.81 out of 5. Participants who perceived the NB app's impact on learning outcomes scored highest at 4.08 out of 5 and lowest in the perceived satisfaction domain at 3.72 out of 5. The mean score for overall satisfaction with using the NB app was 3.9 out of 5. Participants' scores levels of satisfaction in application format, contents within the application, and contents within the E-book attached to the app were 3.98, 3.88, and 3.86, respectively.

Table 1 Summary of perceptions and satisfactions on the Nursing Book Application reported each subscale (n=22)

Domain and Subdomain	Mean score	Standard Deviation
Perceptions (overall)	3.81	0.82
Learning	4.08	0.64
Usefulness	3.86	0.73
Satisfaction	3.72	0.87
Satisfaction (overall)	3.94	0.75
Application format	3.98	0.73
Contents within the application	3.88	0.75
Contents within the E-book or PDF files	3.86	0.82

Note: Scored on a Likert scale of 1 to 5:1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree.

The proportion of participants who reported a 'agree' or 'strongly agree' level of perception and satisfaction with using the NB app is reported in Table 2. Most participants (20 out of 22) perceived using the NB app to provide clinical practice for delivering care to adult patients in the hospital. However, only half of them (11 out of 22) expressed they enjoyed the NB app while they used it for self-studying, and the least were entirely focused on learning to prepare clinical practice through the application (10 out of 22).

Table 2 Frequency and percentage of participants of perception and satisfaction scored agree and scored strongly agree on using the Nursing Book Application (n=22)

Domain	Subdomain	Item	Frequency (percentage)	Mean (SD (Standard Deviation))
Perception	Learning	Using the application can increase knowledge	19(86.36%)	4.00(0.53)
		The application provides nursing practices information to prepare for the delivery of care for patients in the ward	20(90.91%)	4.09(0.75)
		The application affects learning to prepare for nursing practice	19(86.36%)	4.14(0.64)
	Usefulness	The application enhances the ability to learn how to prepare for your nursing practice	14(63.64%)	3.77(0.69)
		Using the application for pre-clinical practice is beneficial	18(81.82%)	3.95(0.79)
	Satisfaction	You enjoy learning through the application	11(50%)	3.50(1.01)
		You like to use the application to prepare yourself for pre-clinical practice	13(59.09%)	3.77(0.75)
Perception		Using the application for pre-clinical practice is beneficial	18(81.82%)	3.95(0.79)
	Satisfaction	You enjoy learning through the application	11(50%)	3.50(1.01)
		You like to use the application to prepare yourself for pre-clinical practice	13(59.09%)	3.77(0.75)
		You entirely focused on learning to prepare clinical practice through the application	10(45.45%)	3.36(0.95)
Satisfaction	Application format	The fonts fit and are easy to read	18(81.82%)	4.00(0.62)
	Satisfaction	The font size is appropriate for the screen	15(68.18%)	3.73(0.83)
		The color of the font and the background are appropriate	17(77.27%)	3.91(0.75)
	Contents within the application	Content is easy to read, and get understanding	17(77.27%)	3.95(0.79)
Satisfaction	Application format	The content is interesting	16(72.73%)	3.86(0.77)
		Using of symbols or images is consistent with the content within the application	16(72.73%)	3.82(0.73)
	Contents within the attached E-book	Content is easy to read, and get understanding	17(77.27%)	3.86(0.83)
	Contents within the application	The content is interesting	15(68.18%)	3.86(0.83)

Focus Group Findings

Eight second-year baccalaureate nursing students participated in the focus group. Discuss the feasibility of applying the NB app in education and nursing practice. Participants experienced the benefits of the NB app for preparing their care plan for patients as a nursing book. Moreover, they pointed out that the NB app was easy to use. However, participants require educators to remodel the NB app to add video-based clinical practice to make it more attractive. All findings from the focus group were presented in Table 3.

Table 3 Feasibility and perceived impact of using the Nursing Book Application from the focus group session (n=8)

Themes	Subthemes	Exemplars
Functionality	Ease of use	"The app was easy for downloading, accessing, and collecting the information (p2)."
	Limited to Android device	"The apps were limited to only an android device, which meant some students could not use this educational resource. Therefore, the researcher needs to revise to work on various mobile operating systems (p5)."
Features	Appealing app is attractive and simple	"The app features with a color drawing indicating each topic regarding the clinical nursing care were so attractive(p1)."
		"The app structure was simple, and I could access the information in only two steps (p2)."
	Need video added	"Researchers need to add the video about clinical nursing practice, and it will be more helpful and be easy to understand, especially in practice elements (p8)."
		"The app had too many contents that were appropriate for studying the principle of nursing. In terms of practices, it should be video-based learning (p3)."
		"I can access the app for learning while practicing in the ward if it is a short video (p4)."
Challenging	Misunderstanding	"Nursing staff did not know nursing students have used their mobile phones for clinical practice learning (p6)."
		"Nursing educators should communicate to the hospital; students will feel free to use the app for preparing the clinical practice during practice in the wards (p1)."
	Wi-Fi available	"The Wi-Fi at the nursing dormitory sometimes is unavailable, especially at nighttime (p7)."
Perceived impact	Usefulness for self-learning	"After finishing practice in the hospital, most students have to go to the nursing library to borrow the books that it has limited (p8).

Integrating quantitative and qualitative findings

Strength of the NB App

Quantitative findings illustrate the strength of the NB app in enhancing nursing knowledge and providing practice-related information to prepare for nursing practice.

Moreover, the NB app is also useful for preparing for pre-clinical practice. These findings align with qualitative data, which further explain the perceived impact of the app in increasing self-directed learning and addressing the issue of limited book availability in the library.

The NB app may be beneficial to nursing education by promoting self-learning through mobile technologies, ultimately improving learning outcomes. For future research, investigating the effectiveness of the NB app on learning outcomes through an experimental design with a two-group comparison remains necessary.

Challenges of the NB App

Quantitative findings show that even though the NB app improves learning related to knowledge and practice, only half of the participants agreed that the app was enjoyable and engaging. This finding contrasts with certain aspects of the qualitative data, which indicate that the app's color illustrations related to clinical nursing care topics were perceived as attractive. Moreover, participants suggested that adding videos might make the app more engaging and better suited for clinical practice learning. These results provide researchers with insights on how to revise the app to enhance its appeal.

Additionally, qualitative findings highlighted functional limitations, including the app's compatibility only with Android devices and the requirement for a Wi-Fi connection. These findings suggest the need to redevelop the app to function offline and be available on both Android and iOS systems.

Another significant issue reported by participants was the misunderstanding among healthcare staff when students used the app during clinical practice in the wards. Staff members did not perceive the use of mobile phones as a learning tool. Therefore, raising awareness about the educational benefits of mobile technologies may help address this issue and foster better understanding among healthcare professionals.

Discussion

This study found that nursing students perceived the NB app as a positive outcome for learning, usefulness, and satisfaction. They pointed out this mobile application can increase their knowledge and practice about adult nursing practicum. The previous studies illustrated a similar finding: clinical learning through mobile applications enhanced learning outcomes regarding nursing knowledge and skills or skill performance[10,22-23]. Similarly, a systematic review and meta-analysis reported that, according to 33 studies, mobile applications were a helpful tool that significantly raised the level of knowledge among healthcare professionals and students[24]. Furthermore, A study found that it enhanced nursing knowledge and the ability to transfer knowledge into the clinical practice of undergraduate nursing students[25].

Moreover, most nursing students are satisfied with using the NB app regarding its features and the contents within the app and attached E-book. They emphasized that the NB app's interface eases the user's navigation ability and provides critical professional skills to

help their clinical learning. Consequently, the previous study found that undergraduate nursing students in South Korea also satisfied clinical knowledge during pediatric clinical practice through a smartphone application[23]. The study also pointed out that nursing students' perspectives on mobile applications helped improve their clinical learning outcomes.

Nursing students agreed that the smartphone application was feasible for delivering clinical nursing education. This finding was like most previous studies; it was advised to develop a mobile application with further nursing courses for nursing students of all levels[10,22,26] For this reason, the application helped nursing students learn efficiently and enhance their clinical performance[27]. In addition, nursing students and educators agreed that mobile applications were acceptable and usable as a tool to improve the quality of nursing education in clinical learning[23,27]. Moreover, previous studies have reported that learning through the mobile application was a helpful technology to allow nursing students to be active and learner-centered, enhance critical thinking skills, and improve self-efficacy[22-23]. In conclusion, mobile learning is feasible to use in nursing education.

However, some features and functionalities of the NB app used in this study were required to modify before implementing further in nursing education. Participants emphasized that researchers need to change the NB app before further employing it with nursing students, significantly adding video-based clinical learning. In the study nursing students suggested adding more audio-visual information, such as diagrams, audio clips, or videos on apps[10]. They expressed that the videos on step-by-step how to deliver clinical skills might make them achieve the necessary competencies and improve learning outcomes. Moreover, the education app should be flexible to use various devices, not only Android. A study highlighted that practical mobile applications in medical education need to consider the low cost, high flexibility, decreased dependence on regional or site limitations, both online and offline availability, simulation, and flexible learning features of mobile apps[24].

Furthermore, the survey findings regarding satisfaction revealed that only half of the participants reported enjoying the NB app for self-studying, while even fewer indicated they were fully focused on using the app to prepare for clinical practice. These results align with participants' feedback in the qualitative data, which emphasized the need for video-based content to enhance the app’s usability for clinical practice. This finding is consistent with previous research, which suggests that incorporating more audiovisual elements, such as diagrams, audio clips, or videos, into educational apps can improve the delivery of clinical skills, helping students achieve necessary competencies and enhancing learning outcomes[10]. These insights highlight a critical area for improvement in digital learning tools, particularly in nursing education, where the integration of theoretical knowledge and practical skills is essential. Incorporating multimedia features like instructional videos could better address students' diverse learning needs and significantly enhance their preparedness for clinical practice.

Finally, there were some challenges in applying mobile phone applications for clinical nursing practice in the Thai context. Nursing students expressed misunderstanding among staff when they use their smartphones for studying while performing nursing practice in the wards. This finding was similar to another study reported that one point raised was the sometimes-negative attitudes of the nursing staff and patients against using mobile devices in clinical settings[10]. Therefore, educators should inform patients and healthcare professionals before using smartphones and apps to teach in clinical practice effectively. Also, changing policies to promote mobile working and learning in the healthcare field may also contribute to a cultural shift in the benefit of this strategy[10]. In addition, the nursing student identified the need for Wi-Fi available support to use the application. This resource support may offer usability of the mobile app, and it may improve learning outcomes as well. The organization should consider this issue and provide support as required.

Limitations

There are some limitations to suggestions for further research. First, the sample size is relatively small that is difficult to find relationships from the data and generalize or transfer. Second, this study was conducted to investigate how the application work without comparing the group. Last, self-reported data from the focus group is limited because it can rarely be independently verified.

Conclusion

Integrating mobile applications helped promote clinical practice among nursing students. The participants were satisfied with the features and content provided by the NB app and perceived its usefulness for self-learning. They also expressed that promoting their learning helps prepare knowledge and skills with adult clinical practice. However, participants pointed out that learning via mobile application in a clinical setting and with Wi-Fi available was challenging.

Implications for future research

The present study guides the development of mobile learning strategies that are more suitable for clinical nursing practicum. Therefore, further studies are expected to justify the proper application with the appropriate design for clinical practice. Also, investigating the effectiveness of the application with a compared group is needed.

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