

ORIGINAL ARTICLE

Mobile Technology in Indonesian Nursing Education: Potential and Challenge

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ABSTRACT

Introduction: Mobile technology such as smartphones and laptops have been a potential learning tool in both academic and clinical facets of nursing education. However, the potentials and challenges of m-technology vary depending on individual, social, technological, and pedagogical conditions. And, studies of this issue in developing countries are lacking. **Objectives:** This study aims to explore the potentials and challenges of m-technology integration in Indonesian nursing education. **Methods:** 25 nursing faculties from three different nursing schools in Yogyakarta participated through an online questionnaire. Eight of them were purposely taken for semi-structured interviews. The data were presented cross-sectionally through descriptive statistics and ascertained with participants' voices. **Results:** The findings delineated how mobile technology is leveraged in both academic and clinical nursing instructions. Three main potentials identified were to promote ubiquitous learning, build autonomous learning, and enhance technological knowledge. Technology affordances, psychological aspects, and the nursing students' attitude emerged as challenges in the current nursing education context. Social, individual, technological, and pedagogical aspects were discussed. **Conclusions:** Mobile technology can mediate and provide better learning for nursing students in academic and clinical settings. However, faculties' pedagogical knowledge and learning regulation of online education is required to be analysed further.

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1. Introduction

Mobile technology such as laptops, smartphones, and tablets has been a potential learning tool both inside and outside classrooms (Sung et al., 2016). In a nursing education context, mobile technology development has led to a new and exciting learning way (Forehand et al., 2017). Mobile technology has been integrated not only in the classroom but also in clinical settings of learning. Application for self-assessment to prepare students before clinical practice (Ortega et al., 2011) and application-based smartphones with videos for infant airway obstruction management learning (S. J. Kim et al., 2017) were few examples of innovations in classroom instructions. Although mobile technology has mainly utilized theory and basic nursing concepts learning (Chang et al., 2018), mobile technology integrations in clinical instructions keep emerging (Beauregard et al., 2017; H. Kim & Suh, 2018; O'Connor & Andrews, 2018). The use of Google+ in-home visit practices, for instance, provides students various opportunities to advance clinical facet learning (Wu & Sung, 2014). As a cloud system storage platform, it enables learners and faculty to exchange information, share documents, and conduct discussions during visit practices (Forehand et al., 2017).

The integration of mobile technologies in nursing education has been studied in the past decades. A meta-review of 97 publications from 1971 until 2016 delineated the development of mobile technology integration studies in the area of nursing education through decades (Chang et

al., 2018). Chang et al. (2018) observed that since 1971-2000, scientists had viewed its potentials. However, research was still limited to perceptions through questionnaires and literature reviews as mobile technology was not yet well developed. Between 2001-2010 and the emerging of computers and mobile phones, mobile phones started to be utilized in nursing instructions. Within 2011-2016, with mobile phones and tablets' proliferation, studies of mobile technology integrations in nursing education showed improvements in numbers. The meta-review denotes that mobile technology shows a positive impact and enormous potential to enhance nursing students' competence. Further, another study on systematic review and meta-analysis found that mobile technology positively influences nursing students' knowledge, skills, confidence in performance, and learning attitude (J. H. Kim & Park, 2019).

Like two sides of a coin, regardless of its potential in learning, mobile technology usage in nursing education cannot be separated from its challenges. The challenges can be obstacles to the success of mobile technology integration in nursing instructions. First of all, internet connection is a challenge in using mobile technology, especially in field practice learning (O'Connor & Andrews, 2018). The quality of learning materials available on the internet is another challenge of M-technology integration (O'Connor & Andrews, 2018). Another external challenge is the non-supportive environment (Beauregard et al., 2017). Beauregard et al. (2017) explain that a non-supportive climate is related to the regulation of smartphone usage limitation in learning and a negative stigma of using smartphones from senior nurses and patients. They consider that using smartphones during training and in the working area is unethical. Besides, internal challenges also contribute to mobile technology integration, i.e., technological knowledge of nursing students and faculty and their self-efficacy (Forehand et al., 2017).

Mobile technology usage in learning instruction is influenced by social, individual, technological, and pedagogical factors (Chavoshi & Hamidi, 2019) that cause mobile technology development in nursing education may vary in different areas. The meta-review conducted by Chang, et al. (2018) signifies that most studies on mobile technology integration in nursing education centralized in developed countries as they mentioned ten countries with the highest publications, i.e., USA (44), UK (14), Taiwan (8), Australia (6), Canada (5), France (4), South Korea (3), Brazil (2), Italy (2), Spain (2), and Sweden (2) (Chang et al., 2018). Concerning the mentioned factors, the potentials and challenges of m-technology integration in developing countries may differ from those in the developed countries as the social and technological conditions are also different (Khan et al., 2019). Considering the great potential of mobile technology in nursing education in some developed countries, it is important to explore mobile technology usage in nursing education to identify its potential and challenges particularly. This study aimed to fill the lacuna of mobile technology studies in nursing education in developing countries, especially Indonesia. Thus, the study results can be the basis of nursing education development in developing countries as it will answer two questions; 1. To what extent is mobile technology used in nursing education?; 2. How social, individual, technological, and pedagogical conditions influence the potential and challenge of mobile technology integration in the nursing education context?

2. Methods

This exploratory study employed an online questionnaire and semi-structured interviews to inquire about the nursing faculties' perceptions of mobile technology integration in their classes. The questionnaire consisted of 25 items that included both closed and open-ended questions. The questionnaire was subjected to gain initial information about the participants' characteristics, teaching experiences, and mobile technology usage in a classroom. The result of the questionnaire was also utilized to determine the samples to gather qualitative data from interviews.

The study was conducted on nursing faculties in higher education institutions in Yogyakarta. The online questionnaire link was distributed to three higher education institutions consisting of one state and two private universities through their social media and online chat.

The online questionnaire was utilized to refer to the health protocol of the COVID-19 pandemic. Twenty-five nursing lecturers from the three different higher education institutions in Yogyakarta gave responses to the questionnaire. 8 of the 25 faculties were then taken purposively for semi-structured interviews based on the inclusion criteria (an active lecturer in nursing school, at least 1-5 years of teaching experiences, and at least 1-5 years of integrating mobile technology in teaching). The interviews were also conducted through distance via either WhatsApp call or zoom meeting.

The data gained from the questionnaire were first coded and then analyzed using descriptive statistics. Meanwhile, the data from interviews were first transcribed verbatim and familiarized by reading and re-reading through the data. Both open questions in questionnaires and interview transcriptions data were coded into emergent themes. Co-author discussed, challenged, and subsequently confirmed emerging themes' credibility to reach assurance of the analytical process.

3. Results and Discussion

3.1 Participants Demography Profile

Participants in this study were 25 nursing faculties from three different higher education institutions in Yogyakarta consisted of 12 females (48%) and 13 males (52%). The majority of the faculties were in age between 30-39 years old (60%). The rest were between 40-49 (20%), under 30 (16%), and more than 50 (4%). The participants had varied years of teaching services. Most participants (36%) had 6-10 years of services. Meanwhile, the others have been teaching for 1-5 years (28%), more than 15 years (20%), 11-15 years (8%), and less than one year (8%).

Table 1 Participants demography profile

Faculty Demography and Background (N=25)	Frequency	Percentage (%)
Gender		
Female	12	48%
Male	13	52%
Age range		
Under 30	4	16%
30 – 39	15	60%
40 – 49	5	20%
50 or more	1	4%
Years of Service		
Less than one year	2	8%
1 – 5 years	7	28%
6 – 10 years	9	36%
11 – 15 years	2	8%
More than 15 years	5	20%

3.2 Mobile technology Integration in Indonesian Nursing Education

Laptops and smartphones were the most frequent m-technology utilized in nursing instruction. The questionnaire data revealed that the majority of participants (68%) used laptops in their instructions. Meanwhile, mobile phones were used by 24% of the participants, and tablets were used by 2% of them. A computer has been a preference to manage asynchronous learning through learning management systems as it is more convenient for the faculty in terms of

technical operations. Meanwhile, for synchronous learning, a mobile phone was preferable, particularly to access virtual conference application. A faculty stated:

"I combine both (Laptop and Mobile phone). In some activities, I use a laptop as if we use e-learning, the home was made for us. Because using a laptop is more convenient than using a mobile phone if it is e-learning. But for direct meeting like through zoom. I often use my mobile phone for zoom." (Respondent 2)

In this pandemic situation, regulation related to education management influenced the dramatic changes to digital learning in all disciplines, including nursing education. However, the data indicate that most faculties (52%) have utilized m-technologies for 1-5 years. Interestingly, one of the faculties confessed that she had made use of mobile technologies in her teaching between 6-10 years. Even four (16%) of them have used mobile technologies in their nursing classes for 11-15 years. The data shows that the participants had integrated mobile technologies in their teaching and learning processes before the pandemic. It was seven months since the positive cases were confirmed in Indonesia. Even though seven faculties (28%) have used it for less than one year and may be due to the pandemic learning situation. Further, two faculties reflected:

"It was in 2013 we started the online learning, but the students only accessed our learning materials like PowerPoint files, uploaded assignments, and besides uploaded assignment there would be a mini-quiz through their laptop and handphone. And then, in Emm.....two or three years ago, we started to use the forum (in e-learning) for discussion. Therefore, in this pandemic situation, we were not too shocked. It is just that the frequency is higher." (Respondent 3)

"I think I started to use it around 2008 or 2007 when we got a competitive grant from Dikti. Because at that time, we developed e-learning. E-learning in this context, students could learn using mobile technology. They could learn using their laptops, and they accessed materials through handphones or smartphones. Yeah... I think we started ten years ago." (Respondent 5)

The data revealed that mobile technologies integrated into the nursing classroom were due to a regulation or a nursing institution policy. The majority (68%) of the faculties stated that they utilized mobile technology because of regulation from their institutions and other external reason like the COVID-19 pandemic that insisted on using the technology. However, some of them (32%) said that they use mobile technology because of necessity and personal initiatives to help them teach and learn processes in a nursing class. A faculty opined:

"e-learning make things easier, I guess, so when I knew e-learning, I fell in love with it right away. Because I like things related to the technology." (Respondent 8)

In the context of nursing learning instructions, mobile technology has been integrated in academic and clinical instructions. Most faculties (60%) pointed out that they have utilized mobile technologies in both academic and clinical learning settings, although ten persons said they were using it in teaching theory or academic learning. Furthermore, they explained that mobile technology was used in the tutorial (52%) and nursing concept theory (48%) learning. These learning activities were more on learning through LMS (92%), online discussion (4%), and assignment through email (4%). A faculty spoke:

"It depends because we have academic and professional levels. If at the academic level, we use the asynchronous (LMS) one. For the percentage, in the context of this pandemic, the

percentage almost 90% we use online. ... in the context of professional level, the profession instruction, we use 70-30 %. For the 70, we use the online one. We use the platforms (Google meet, zoom), and for the 30% we use offline, the students need to practice at hospitals.”...
(Respondent 1)

It cannot be denied that the COVID-19 pandemic situation influenced the acceleration of mobile technology usage in Indonesian nursing teaching and learning processes. It follows the health protocol in Indonesian education in which instructions are conducted mostly in digital media to keep distance and avoid meetings. As the study conducted in the middle of this situation, mobile technology usage in nursing education today is probably much influenced by the current social situation. However, some findings also tampered with today's education situation of mobile technology. It found that mobile technology integration in nursing education has been engaged mostly for 1-5 years and even for 11-15 years in the nursing institutions Yogyakarta. It means that it has been conducted even before the pandemic.

3.3 Potential of mobile technology in Indonesian Nursing Education

Three main potentials of mobile technology emerged in the nursing education context i.e. promoting ubiquitous learning, building autonomous learning, and improving technological knowledge. Although mobile technology has been broadly discussed as its characteristics to promote mobile and ubiquitous learning, mostly they were in the settings of language arts, engineering, and computer technology (Sung et al., 2016). However, this study found that the nursing faculty also viewed mobile technology's contribution and needs for creating ubiquitous learning. A nursing faculty spoke a reason why he made use of mobile technology:

“I think my philosophy is that my students can learn everywhere.” (Respondent 4)

Mobile devices' functionality and portability provide nursing student learning beyond spatial and temporal confines (Bernacki et al., 2020). Nursing education's learning complexity that spans academic and clinical learning practices made mobile technology potential media to support nursing students in these learning situations (O'Connor & Andrews, 2018). Therefore, the flexibility of accessing online educational material is considered a critical element in nursing education (O'Connor & Andrews, 2018). The nursing faculty added:

“If they have the smartphone or if they have the internet coverage. No need to come to campus to get the materials.” (Respondent 4)

Another faculty said:

“So, outside the lecture time, commonly students have something they do not understand yet (related to learning materials). They will contact me via WhatsApp (m-phone application).”
(Respondent 6)

Besides, to the nursing faculty, integrating m-technology in their teaching can be a part of their professional development. Responding to the rapid development of technology, they realized that they need to cope with the new world views in nursing education with the presence of technology. Mobile technology is an influential part of people's lives now (J. H. Kim & Park, 2019) and considered a critical aspect of students' academic success. Thus, mobile technology is the technology the nursing faculty should embrace to formulate innovative educational methods to fit current student's characteristics. A faculty explained:

“...then lecture mustn't be in the classroom. Can be at home. It can be everywhere. So, it's widely opened now. It means that it's not only classical learning, but learning can be

anywhere. That's.... with the various current media, we can develop ourselves..."
(Respondent 5)

Another faculty observed:

"To me, technology will always develop in the future so we cannot avoid that. Therefore, we need to maximalized technology for our instructions." (Respondent 1)

This study also found that m-technology promote the nursing student's autonomy or agency. Both independence and agency have a similar meaning, but a theory claimed that learners' initiative grounds their distinction (Suárez et al., 2018). For instance, in a clinical lecture, the faculty illustrated that students enacted a roleplay of nursing interventions as a skill evaluation. M-technology was utilized to video record their performance and to submit the result of the video so that the faculty in the distance could ascertain the intervention steps they perform. However, the faculty found that most students did a well-sequenced intervention assigned. It turned out that the students made self-reflection of their performances. They took videos of their performances several times until they made one that they considered correct for submission. A faculty illustrated:

"So, we only evaluate the students' videos. How they did it, that's what we evaluate. But I think the students are clever already. When they made mistakes, they would repair them. So, they send the video that they consider perfect for the skill. So, I think they will take the videos several times, not only once. So, they can repeat it many times. ... if their performance is not the same as the theory or guidance book said, they will retake it. So, they also did a self-assessment. "Oo..here is my mistake".
(Respondent 1)

The above illustration portrays how m-technology enables learners to be more self-reflected in clinical learning. Self-reflectiveness is one of four main characteristics of human agency (Bandura, 2001). The students might subjectively judge their performance, ask for feedback from their classmates, and make necessary revisions of their performance based on those feedbacks and learning sources they have. This learning strategy builds the learning environment to be more student-centered (Forehand et al., 2017), where the faculty's role is to facilitate learning.

In the context of academic learning, mobile technology was leveraged as a tool to material provisions. As the current nursing students demand high learning connectivity (Forehand et al., 2017), accessing learning materials anytime and anywhere becomes necessary in learning. In the students-centered theory, the faculty's role is to select tasks, assist students' collaboration, and provide formative feedback (Pakdaman-Savoji et al., 2019). Providing learning materials that consist of appropriate assignments and learning activities may promote the learner's autonomy. However, the faculty's pedagogical knowledge will influence the effectiveness of the material provisions. Two faculties spoke:

"But for theory instruction, I think the students can access in the internet, Youtube, and others. So, the lecturer's role is only to validate and show the correct way to the students. Because there were contents in the videos which are not relevant. Therefore, the lecturer's role is to give validation and assistance." (Respondent 1)

"so far, it's more on that and giving a Youtube link. I will give them links to open the Youtube, and they watch a video from the Youtube link. Even for some materials, I ask the students to join a webinar which is now booming." (Respondent 2)

Concerning individual, social, and technological issues, m-technology may enhance nursing faculty and nursing students' technological competence. This study found that their social demographic situation may also influence the potential of m-technology in Indonesian nursing education. Infrastructure development disparity makes nursing students have various technological competence. Students from certain areas in Indonesia have less technological competence than those who live in big cities. Integration of m-technology in nursing education was considered necessary by the faculties to prepare the students for the national nursing examination computer-based. [Lisum & Sianturi \(2020\)](#) Focusing on learning to the national nursing examination may lead nursing students to develop their learning style. A faculty observed:

“So when they already prepare during the study, when they have a mid-term exam, they have their final semester exam, they use the computer, they use mobile technology. So, when they go for the computer-based competent examination at the national level, they feel easier and they feel well prepared. Because, we can compare our students with the students from other remote areas that they don't have computers. So, our students are more well prepared to have the national competence examination which is computer-based. They prepare and understand the computer well. They understand the software well because every semester, every midterm, they already use this technology to do their examination. So, at least, it will reduce their anxiety when they have a national examination of the competency. This is I think the benefits of e-learning in our campus.” (Respondent 4)

The enormous development of mobile technology in health areas has altered the faculty's individual belief towards the importance of technological competence in nursing education. Besides, technological skills should be a part of nursing competence as the current students will embrace the era of digital health. The nursing faculty believed that integrating mobile technology in nursing instruction will prepare nursing students for their future job situations in health institutions. She thought that providing students with initial technology provisions will help them in their future professional career as a nurse. A faculty opined:

“So may be, the use of online learning or technology train lecturers and students not to be technologically backward. So, when there is a development, may be now some hospitals have already implemented nursing care, not in the written document but with I-pads. So, in my opinion, we indirectly give the students initial provisions of technology. So, in the years that they become a worker or a nurse or anything, they will not be technologically backward.” (Respondent 2)

Not only students but nursing faculties may also unconsciously enhance their technological competence through mobile technology integration as they will do self-improvement in leveraging mobile technology. Although technology integration is mainly used because of the current social factor of the distance learning regulation in the pandemic, it indirectly generates what ([Chavoshi & Hamidi, 2019](#)) called a social influence (SI). This SI led the nursing faculties to initiatively develop their technological competence to cope with the current teaching and learning situation in nursing education. In a specific social context like an organization, organizational culture contributes to individual self-efficacy ([Alifariki et al., 2020](#)). A faculty delineated:

“For example, if we want to use e-learning, not all of the features in the e-learning we have understood. Maybe, we want to show the audio, we need to learn although we have been trained how to use it. But, we need more practices. Or, for example, we want to make a video or power point with sounds, it needs different skills ya.” (Respondent 2)

“It means that I have to learn, learn about technology, should be aware of current technology. And I have to spend more time to prepare online learning media.” (Respondent 6)

3.4 Challenges of mobile technology integration in Indonesian Nursing Education

Internet access has become the main challenge in integrating mobile technology in nursing instruction. According to the questionnaire data, most nursing faculties (72%) confirmed that their students were ready with the technology, including internet access in the learning. However, the rest of them (28%) lamented that not all of their students afforded the technology. Infrastructure disparity and internet data affordances were considered as the learning barriers in leveraging mobile technology. Two faculties said:

“because students went back to their home towns, some locations have good internet access and some not. As an impact, learning is not maximal actually because the internet is not available particularly the students who live in remote areas. So, the students cannot access learning and learning is not maximal.” (Respondent 1)

“..Signal still becomes a barrier. So not all students can access easily because some students have limited internet data or his living place location cannot reach it (internet). Commonly, that’s the problem...” (Respondent 2)

The data delineate that nursing students’ demographic condition influenced their capability in accessing learning through mobile technology. The current pandemic situation made students learn from their location in their hometowns. It cannot be denied that not all Indonesia areas are equipped with facilities that support internet access. Besides, not all students can afford the internet data or *quota* for accessing learning. These issues hinder learning transfer and acceptance. However, on the other side, it fosters the presence of social justice in education (Nowell & Poindexter, 2019). Further, a faculty explained:

“we need to have that flexibility sometimes. If our expectation is 100, we low it down to 75. For example, in offline meeting they’re supposed to get ...if we talk score 90, I mean 80 for instance, because of the pandemic, they will get higher due to those conditions” (Respondent 1)

Psychological aspects also became a challenge in conducting teaching and learning through m-technology. Motivation and self-efficacy are psychological aspects that m-technology commonly engages and enhance (Chang et al., 2018; Rashid & Asghar, 2016). Differently, (Pebriani & Marleni, 2020) found that m-technology indirectly contributes to decreasing nursing students’ motivation in learning. This study found that the faculties concerned about their students’ attitudes showed demotivation in learning through online media. As mobile learning characteristics need students to learn autonomously, independently, and more self-directed (Wang & Higgins, 2005), motivation will determine their learning success (H. Kim & Suh, 2018). A faculty lamented:

“...however, students’ attitude is about the same. Although we have prepared learning materials (in e-learning) for them, sometimes they didn’t check it or check their e-learning..” (Respondent 5).

Interestingly, this study revealed that learning migration from a physical classroom into a digital classroom also negatively impacts the faculties. The pandemic situation that insisted on the faculties to conduct dramatic changes in their instruction led to a shock digital learning culture.

“To me, I have plenty problems. So, I have to learn how to make a good ppt with sufficient time. So, the efforts to make the materials and preparation were harder.” (Respondent 3)

“...to a senior lecturer like me or the older one, many of us were stressful or left behind.” (Respondent 7)

The above challenges were interrelated to the faculties' technological knowledge. The low technological knowledge for a teaching and learning process made the faculties work harder to provide the digital learning materials accessible through students' mobile technology. On one side, the social situation might lead them to better technological literacy. Still, on the other side, it became an obstacle for them in teaching and learning processes as they have to personalize themselves with technology; however, at the same time, they need to ascertain that their students could cope with the new learning situation. A teacher spoke:

"For example, we made a video, like power point with sounds, then it needs more skills Sir. So, really, it becomes a barrier of the instructors." (Respondent 2)

Not only psychological and technological issues, another issue which the nursing faculty concern about related to the teaching-learning process through mobile technology was nursing students' attitude in the learning processes. The faculties lamented the passive responses of the students during synchronous learning. The students often set their camera off during a video conference, and there was only little class interaction. Although the technological problems may cause it, the faculty seems to consider these attitudes as students' demotivation and unethical behavior. A faculty lamented:

"When we're online, it's like we talk to ourselves. Where the students are, they even do not respond us. So, sometimes, I have to prepare myself. I have to be ready when they were sleeping and doing other activities (during video conference class)." (Respondent 3)

She added:

"Then, was it really a signal problem? But they did it many times. It's more on motivation, I guess. Yeah.. May be we need to prejudice but we also need to be careful. Sometimes they have difficulties in entering the room (video conference) or I don't know in the forum (elearning). They only gave comments once and "jling" they disappear." (Respondent 3)

However, another faculty prescribes this issue as a pedagogical challenge. She believes that transferring a classroom meeting into a digital one requires a nursing faculty to have an innovative pedagogical skill. Learning needs to be packaged in a well-planned lesson to meet technological limitations. A faculty pointed out:

"So the instruction method needs to be packaged yaa because we cannot directly see our students. So, when we are online, although we use zoom, sometimes many students turned off their cameras. So, we do not know whether the students did something else or not. We cannot control them like we're in the classroom. If in classroom meeting we can ..oo this student is sleepy. But in online meeting, we cannot control one by one. May be that is the part we are not ready" (Respondent 2)

Mobile technology integration in Indonesian nursing education has spanned both academic and clinical facets of learning. Although the pandemic and current social situation significantly contributed to mobile technology usage in the current nursing education, this study revealed that some nursing faculties have already utilized this technology in their classes even before the pandemic. The faculties' characteristics indicate that age is not a variable to mobile technology usage in nursing education but is more on self-efficacy or confidence of use (Forehand et al., 2017). In academic settings, mobile technology was still leveraged in the surface of access to the content of learning materials. Meanwhile, mobile technology cannot be fully integrated with clinical instructions. Some skills cannot be learned through m-technology, for instance, skills that need direct practice to patients. However, mobile technology was leveraged mostly to mediate a

discussion between faculties and students during clinical practices such as case presentation, meet the experts, pre-conference, conference, and post-conference.

This study explored three potentials of mobile technology in Indonesian nursing education, which is, i.e., to promote ubiquitous learning, build autonomous learning, and improve both the students' and faculties' technological knowledge. Nursing education that spans both academic and clinical settings requires learning accessible anytime and anywhere (O'Connor & Andrews, 2018). Particularly in clinical instructions, as nursing students are dealing with challenges in translating theory into practices in the field practices (O'Connor & Andrews, 2018), mobile technology provides unlimited access to learning materials without temporal and spatial restraints (J. H. Kim & Park, 2019). Although the mobile technology in the context of the study was still used to mediate interactions between students and instructors during field practice for feedbacks and evaluation, it may provide students' assistance in the absence of peer supports to low their anxiety and improve their confidence in clinical practice (Beauregard et al., 2017; S. J. Kim et al., 2017; O'Connor & Andrews, 2018). As an impact, it will also guide the nursing students to be more independent and autonomous in learning. Mobile technology like smartphones, opens unlimited access to information and provides a more self-directed learning environment (S. J. Kim et al., 2017). A self-directed learning approach is considered crucial in nursing education (H. Kim & Suh, 2018). Concerning the social context of the study, mobile technology integration in nursing education was also considered to improve the faculties and students' technological knowledge. The individual technological skills index, which is 5.76 out of 10, shows how important it is to enhance nursing students' and instructors' knowledge in technology to embrace better learning. Providing them with more experiences in using technology for learning will make effective use of m-learning in nursing education (Chavoshi & Hamidi, 2019).

However, these potentials do not come without challenges. Technology affordances became one of the common challenges of mobile technology integration emerging in this study due to IT development disparity between urban and rural and socio-economic conditions. These issues happen mostly in developing countries, as some do not have a budget to provide each student's supporting facilities (Chavoshi & Hamidi, 2019). Chavoshi & Hamidi (2019) claimed that parental support could be an effective solution to this problem. However, due to varied socio-economic conditions, some parents may not fully support the nursing students to access learning because of its high cost. This indicates how social and technological issues are interconnected and determine m-technology integration in nursing education. Besides, the nursing faculties' aspect also needs to be considered a challenge in m-technology integration. A low self-efficacy may lead the faculties to negative attitudes towards mobile technology in their instruction. Self-efficacy allows nursing faculties and students to feel confident and proficient in an m-Learning environment (Forehand et al., 2017).

Although most studies claimed that students were more motivated and engaged in learning with mobile technologies (Sung et al., 2016), this study found that the nursing faculties lamented their students' demotivation and improper attitudes in the learning. The nursing faculties claimed that turning off the zoom camera and responding passively during synchronous learning represent students' demotivating and inappropriate attitudes. These issues cannot be put aside, as a good character is one of the important aspects of nursing education (Sellman, 2007). However, considering those activities as improper or unethical may not be relevant because there is no regulation yet related to what the students should and should not do in synchronous learning. This is because ethical judgment is a cognitive process and subjective (Cristina et al., 2021). These students' attitudes maybe also the results of the faculties' pedagogical readiness in learning strategies of m learning (Abidin et al., 2017; Chang et al., 2018), students' proficiencies in learning through m-technology (Forehand et al., 2017), or other individual factors such as self-efficacy (Forehand et al., 2017). Therefore, educators need to formulate a regulation of online learning to meet the cultural and learning barriers.

This study is not without limitations. First, limited participants limited the generalizability of this study. However, various nursing schools the participants affiliated to, which span state and private, provide a rich perspective from the different learning situations. Second, as this study

viewed the investigated issue from one viewpoint and in the form of self-reported perceptions, the result could be biased. Thus, other alternate perspectives such as nursing students, clinical instructors, patients, and organizational management suggest providing comprehensive impacts of m-technology in nursing education.

4. Conclusion

This study explored mobile technology integration's potentials and challenges in Indonesian nursing education from the nursing faculties' perspectives. Mobile technology has been leveraged in both academic and clinical settings by nursing faculties. Mobile technology commonly utilized in the instruction were laptops and smartphones. These technologies were mainly used to access LMS and conduct online discussions to facilitate nursing students' learning. Although the current pandemic situation significantly contributes to mobile technology usage in nursing schools today, this study also found that m-technology has been used in nursing instructions mostly for 1-5 years, even more than 15 years. It means that it has been utilized even before the pandemic but still in teaching basic nursing concepts.

There were three main potentials of m-technology in nursing education identified in this study, i.e., promoting ubiquitous learning, enhancing autonomous learning, and improving technological competence. Its portability and flexibility allow students to access learning without temporal and spatial constraints and make students and instructors connected, especially in clinical practice. Meanwhile, it will help the instructor create a more learner-centered approach that leads the nursing students to have more learning autonomy. Finally, the current social situation insisted the nursing faculties and students explore and have valuable experience in leveraging the m-technology in their teaching. This experience will possibly improve their technological skills.

However, some challenges were considered to influence m-technology integration in nursing instructions. Technology affordances such as internet access and supporting facilities have been common problems in m-learning. Technological development disparity and socio-economic issues were assumed to be the factors of this problem. The dramatic change from a conventional into a digital classroom also impacted the faculties' psychological sides. Their technological skills may need to be improved to lower this anxiety and increase their self-efficacy. The faculties also lamented the nursing students' attitude during the synchronous learning activities. Turning off the camera and giving passive responses during the learning were perceived as improper and unethical by the faculties. However, this perception may not be appropriate as there is no regulation and applicable provision yet related to online learning primarily through mobile technology. Therefore, it is suggestive in further studies to understand learning strategies and ethical issues in online learning to formulate the applicable provisions.

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