

Mobile Based Learning Development for Improving Quality of Nursing Education in Indonesia

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Abstract - Around 47.6 percent of Indonesian Internet users access the Internet through their mobile devices. There is already a desire for Internet users to utilize gadgets from PC and laptop computers to mobile devices, according to this. Face-to-face instruction in the classroom is giving way to online learning as a result of technological advancements and a shift to mobile devices. A mobile-based online learning management system (m-LMS) has been proposed by the researcher to be utilised and embraced by students and lecturers at the nursing school. The purpose of this research is to learn about the preferences and requirements of future nurses when it comes to utilising cellphones as m-learning medium, as well as their views on the appropriateness of m-learning learning via smartphones. Interviewing nursing school students and professors to gather data. This research employed a basic random sampling method. The findings showed that nursing students were excited about using cellphones to study online, and the most requested feature was the availability of learning materials that students could download and read anytime they wished. The study's findings led to the creation of a mobile learning development model for nursing school students and instructors.

Keywords—education, learning management systems, mobile learning, online learning, nursing

I. Introduction

Inadequate and unequally distributed human resources are at the root of the health sector's shortage, according to [11]. Doctors, midwives, and nurses are examples of health care workers. To ensure that there is equitable access to health workers, especially nurses, the government of the Republic of Indonesia has a duty. Health care employees are in great demand in Indonesia, particularly in the field of nursing. There was a 33% rise in the number of nurses needed between 2014 and 2025 as a result of the 2014 Health Law's estimated need for health personnel. As a result, the need for foreign health professionals has surged by 45 percent, from 9,280 to 16,920 persons (in 2014 to 2025). In light of this, the Government and nursing education institutes should pay more attention to the need for nursing personnel.

Indonesia has a large number of people that are interested in becoming nurses or nursing students. It is necessary to use a remote learning system or the internet to reach potential pupils who are dispersed.

Internet users in Indonesia with 89.7 percent student penetration are based on technology advancements [5]. However, just 9.2 percent of Indonesian internet users say they utilise the service for educational purposes. For educational institutions, this provides a problem in creating high-quality instructional materials. In order to enable online and long-distance teaching and learning activities, a learning management system must be built. As a result, excellent nursing personnel may be produced as a result of better education in the sector.

Educational institutions are also seeing this shift [5] due to advancements in technology and the shift to mobile learning. Additionally, education in nursing requires the attention of several parties. In addition to classroom instruction, the learning system may be completed online. As a result, nursing educators and students alike are eagerly awaiting the arrival of mobile learning tools that will aid in their online education. Using m-learning as a new paradigm for Indonesian nursing schools will be discussed in this paper. Mlearning in Indonesian nursing schools is examined in terms of its potential advantages, infrastructure requirements, user perspectives, preparedness, and difficulties. This study will help in the design and development of an m-learning platform for Indonesian nursing schools.

The issue to be studied as a result of this backdrop is as follows:

- a. How can students and professors use online learning materials as a learning resource?
- b. When it comes to online learning, what are the demands of students and lecturers in the area of nursing?
- c. How will online nursing education be delivered through mobile devices?

To put it another way, this study is of critical importance.

- a. Assist government initiatives to boost nurse staffing levels.
- b. Helping government initiatives to improve nursing staff quality
- c. In order to help conduct online learning programmes for the administration of nursing schools.

II. Theory

It is the goal of online learning to foster a sense of purpose, motivation, and open communication in order to foster productive learning settings.

[21] Preliminary research have indicated a substantial association between online learning activities such as individual assignments and group assignments; student attendance at video conferences; active participation in online discussion forums; and willingness to complete online quizzes;

Using a Learning Management System, students may access online learning resources efficiently [26]. Students reviewed lecture notes, PowerPoint presentations, instructional films, and online tests. Text-based content was shown to be more effective at inspiring and aiding students in their comprehension of lecture material by this research team. According to another research, students' learning experiences would be enhanced by participating in online discussion forums. Students' enthusiasm in online classrooms may be boosted by the success of lecturers in organising online classes [28].

According to Vaghela [23], internet-based learning materials in the form of graphics, audio, video, and animation may inspire students to study and can be utilised easily to grasp the subject offered in the course (Fig. 1).

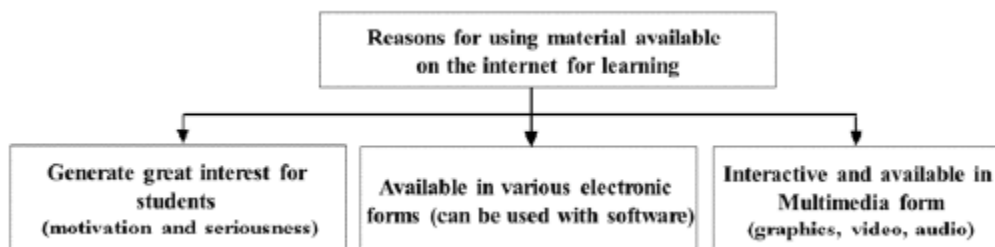


Figure 1. Learning Materials via the Internet

Universities have embraced mobile learning to better meet the demands of their students [8]. Student age and student worker position were shown to be important predictors of mobile LMS uptake in the research. A favourable correlation was found between online students' academic performance and their usage of a mobile learning management system (LMS). A total of 1,604 students from a Korean online institution participated in this research.

III. Development Of Nursing Education And Mobile Technology User Behavior In Indonesia

A Development of Nursing Education in Indonesia

Licensed nurses in Indonesia are those who have completed nursing postsecondary education that has been approved by the country's government in compliance with relevant laws and regulations, as described by Law No. 38 Year 2014 on Nursing. In nursing, "the action of giving care to people, families, organisations, or the community, both ill and well," may be described.

While in 2014, there were 94.7 nurses for every 100,000 Indonesians, there were 87.65 nurses per 100,000 Indonesians in 2015. Both are still far from the 2014 aim of 158 nurses per 100,000 Indonesians, even far from the 2015-2019 Ministry of Health Strategic Plan target of 180 nurses per 100,000 people. As of December 2016, 29.66 percent of all recapitulation of Indonesian health professionals were nurses, according to statistics from the Health Human Resources Development and Empowerment Agency (BPPSDMK). Here's a visual representation of Indonesia's nurse-to-patient ratios for your perusal:

Table 1. Ratio of Nurses per 100,000 Indonesian Population in 2016

Province	Ratio of Nurses per 100,000 Population	Ratio Status
DKI Jakarta	>180	High
Kalimantan Timur	>180	High
Bangka Belitung	>180	High
Aceh	>180	High
Maluku	>180	High
Sulawesi Utara	>180	High
Bengkulu	>180	High
Jambi	>180	High
Lampung	<158	Low
Jawa Barat	<158	Low
Banten	<158	Low

There are still locations in Indonesia where the ratio of nurses to population is lower than projected, such as in Lampung, West Java, and Banten, according to the Ministry of Health of the Republic of Indonesia (MOH). These three regions still have a long way to go in terms of achieving their goal of having enough nurses. The Indonesian Ministry of Health is actively involved in the development of Indonesian nursing education via funding for both public and private nursing schools, offering nursing development training, seminars, and nursing workshops.

B Mobile technology user behavior in Indonesia

According to Akamai's statistics [4], Indonesia has the fastest mobile internet in Southeast Asia, with a speed of 12.8 Mbps, two places ahead of Singapore. Indonesia saw an increase from 6.9 Mbps to 12.8 Mbps during the previous year.

In the past five years, Indonesia has been ranked among the top five nations with the fastest internet. Figure 3 shows that Indonesia has the fastest mobile internet in Southeast Asia, beating out Singapore and other neighbouring nations.

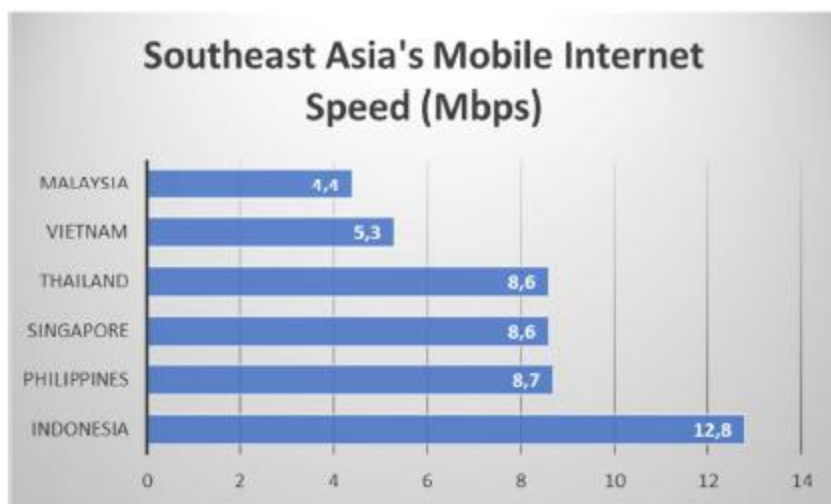


Figure 2. Internet Speed Ranking in Southeast Asia

As a result of the country's high population density, changes in lifestyle have occurred that formerly did not recognise technology but today practically everyone has been exposed to

technology from an early age forward. The words "digital native" and "digital immigrant" are used to describe two distinct groups in the realm of technology. In the words of Marc Prensky, a "digital native" is a person who has grown up in a world where technology, such as computers, the internet, and animation, has been a constant presence in their lives from birth. While the term "digital immigrant" refers to a person who migrated to the United States before the invention of the personal computer [20] and [19]. The majority of Indonesian internet users are between the ages of 18 and 25, with a total of 49 percent of the population falling into this age bracket. We may infer from the argument provided above that advances in technology and the internet have the potential to have a tangible and immediate impact on Indonesians' daily lives.

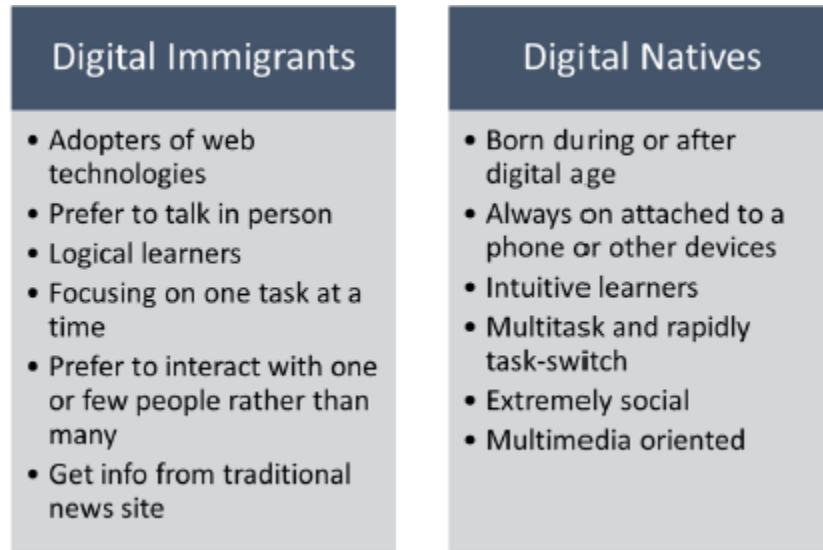


Figure 3. Digital Native and Digital Immigrant

Mobile applications are more popular among smartphone users in Indonesia than the existing mobile web because of the added convenience they provide and the country's high level of daily activity. Jakpat, a mobile survey platform in Indonesia, performed a poll and found that 67% of consumers prefer mobile applications over the web. Users prefer to utilise mobile applications because they are more comfortable using them [3].

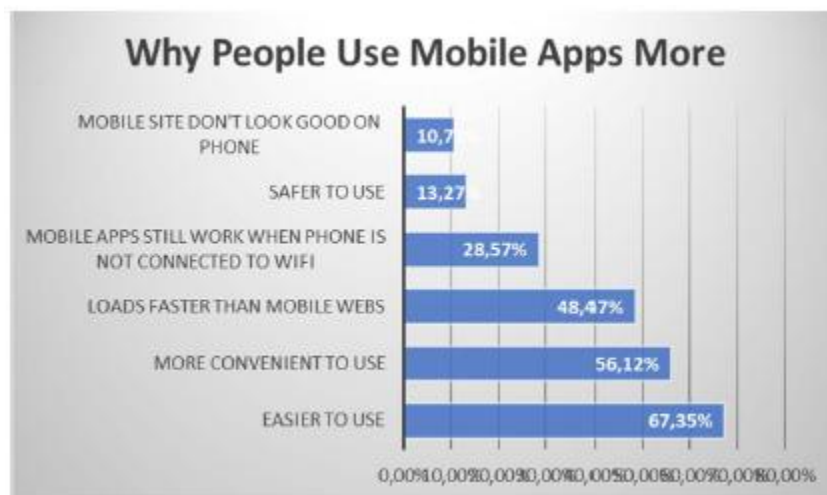


Figure 4. Why People Use Mobile Apps More

IV. MOBILE LEARNING OPPORTUNITIES AND CHALLENGES FOR NURSING SCHOOLS IN INDONESIA

There is a strong correlation between student happiness and how well teachers communicate and how easy it is for students to use their materials. [9] e-learning resources and content must provide students synchronous and asynchronous engagement possibilities, according to [22], and instructors and students must have access to a variety of ways to engage in that interaction. Students that can efficiently utilise technology will report higher levels of satisfaction in the classroom. Students' motivation must be able to rise on its own as a result of the activities provided. Using online technology is an effective way to maintain the status quo on a bigger scale than face-to-face in the classroom, according to [24]. Students' attitudes on the addition of "e-tools" to curricular requirements have been shown to be favourable in study [10]. However, "e-tools" must be properly matched with the course's goals in order to have a positive impact on student learning and learning outcomes.

Educational software may be used to promote knowledge construction and learning in distant education for nursing, according to [16].

The outcomes include a clearly visible and highly precise health care cycle, as well as a number of scientific items that may serve as a foundation for nursing practise in the field. Learning Management Systems (LMS) are designed to keep student data to a minimum and manage the education cycle ([7]; [25]). Learning management systems (LMS) are able to better record learning transactions, promote teacher-student interaction, and streamline the assessment process. [2] demonstrates that lecturer satisfaction is strongly influenced by the rewards they get and the quality of the service they receive. In order to meet the demands of both professors and students, the LMS should be created using the most current technologies.

Researchers are looking at the impact of learning management systems (LMSs) on students' grade information. LMS-based feedback is more valuable to students than LMS-based feedback that students have to download and manually enter into their LMS accounts. A Learning Management System (LMS) and a computer-based concept map were built [6]. Collaborative learning increases the quality of interaction amongst LMS users, particularly students. This exploratory research found that this effect is most pronounced in the collaborative learning mode."OntoSakai," a new ontology model for LMS optimization, was presented by [17].Processes may examine LMS user behaviour using this approach.

Learning aids, user profiles, and semantic classifications of LMS items are all part of the OntoSakai learning process, which has four components. The findings of this research show that the LMS service "OntoSakai" is capable of enhancing student satisfaction and academic performance. When it comes to online education, tutors play a critical role in interacting with students or learners. The dynamic nature of the class will be enhanced by the capacity of tutors to administer the LMS.

[1] used an object-oriented e-tutors to agent-oriented e-tutors methodology to construct an LMS application. When used in conjunction with a learning management system (LMS), an agent-

oriented e-tutor system improves the effectiveness and efficiency of the educational process. It is difficult to establish m-learning in nations like Indonesia because of the following reasons:

Table 2. The Challenges of Developing Mobile Learning in Developing Countries

Challenge Category	Challenge Details
Technical Challenges	Internet network, especially in rural areas, the activity layer is small so that it is not too free, the specifications of the cellphone used are not enough to support the learning media format
Security Challenges	Network security from data theft activities, learning media plagiarism, learning media copyright protection, the presence of viruses and malware that can enter devices,
The Challenge of Community Acceptance	Adoption of community technology is still low, there needs to be training in the use of applications, the costs incurred in purchasing internet quotas
The Challenges of Online Learning Pedagogy	Need to adapt to independent learning, need to adapt understanding of the material without being accompanied by a teacher, quizzes and assignments online, learning media that can be accessed at any time, learning objectives that are adapted for online learning.

V. Research Design

This study falls under the category of prototype experimental research, with the goal of developing, generating, and testing mobile learning media (mlearning) in nursing schools. Using a number of core nursing disciplines as a pilot project, this system was developed at the Nursing Academy in Jakarta and cooperated with a local hospital. Students and professors at the Husada Hospital's Nursing Academy in Jakarta were the subjects of this study's research. Purposive sampling was utilised in this study's sampling method. For the purpose of gathering information, researchers will interview, poll, and have Forum Group Discussions (FGD) between April and July of 2019. In order to acquire information regarding the current learning process, interviews are performed with the management and management of nursing study programmes. With the help of study programme managers and Subject Matter Experts (SMEs), online learning materials will be developed in FGDs. After the first rollout, a poll will be administered to Nursing Academy students who plan to utilise the mobile LMS app.

Five nursing students from the Husada Hospital Nursing Academy in Jakarta were interviewed for this study. Interviews and observations were done with the Nursing Study Program management in order to get information regarding the academic learning component of the syllabus, learning outcomes, learning materials, and supporting forms. Interview questions for nursing students include the following:

1. What is the source of the present lecture material? If so, is it easy to get your hands on?
2. What other learning tools are students looking for in addition to course material?

3. What kinds of educational material may students anticipate to encounter?
4. Besides the professors, who else is there?
5. How much time do you spend on the internet each day?
6. How many hours per week do students spend accessing educational materials through technology?
7. What online courses are the most popular?
8. Do you prefer to use internet or offline media for reading educational materials?
9. Have you ever used any kind of online educational resource?
10. Are there any online learning resources you've used?
11. When it comes to accessing online learning resources, what are the barriers that people face?

VI. Results And System Design

The data gathered in this study comes from interviews conducted by researchers with nursing students at Husada Hospital in Jakarta, Indonesia. The following is a rundown of what was discussed during the interview:

Table 3. Research Interview Summary

Item Questions	Summary of Respondents' Answers
Q1: Sources Obtain current lecture material	Learning in the classroom by explaining the theory of lecturers and learning practices in hospitals.
Q2 : Current Learning Media apart from Lecturers	Lecture material through printed books, lecturer presentation materials, theory modules, practice modules, video links shared by lecturers via email
Q3 : Current Learning Media Resources apart from lecturers	The internet is like Youtube for finding and studying practical videos and research articles
Q4 : Internet usage in 1 day	10 – 12 hours per-day
Q5 : Technology media in accessing learning material	Handphone and Laptop
Q6 : Lecture material sought online	The procedure and practice of handling and caring for patients
Q7 : Reading of lecture material via online or offline	Looking for lecture material through online then downloaded to read offline
Q8 : Access online learning media	Always use online media to look for additional material besides learning material from lecturers
Q9 : Online Learning Media ever seen	Practical videos and research articles
Q10 : Obstacles to accessing and understanding online learning media	Limited internet quota, inadequate network in the room, understanding foreign terms in videos and articles, search keywords for lecture material online

Based on the findings of the aforementioned interview, it can be determined that nursing school students already use internet media to get lecture content in addition to acquiring lecture material from lecturers. Rather than a formal lecture, they're searching for a movie that can be used in a classroom setting to demonstrate how to interact with and treat patients. Students in nursing school are no strangers to online learning media, which means that m-learning apps may take use of this.

The restrictions and problems of the internet network are the same ones that online application developers encounter when trying to provide students with access to educational resources. The Indonesian government intends to strengthen the network by instructing Indonesian telecoms service providers to accelerate network development, particularly in rural regions.

Based on the results of the aforementioned interviews, the researchers have proposed a mobile learning model (m-learning) for Indonesian nursing schools, based on the findings. The following is a paradigm for understanding:

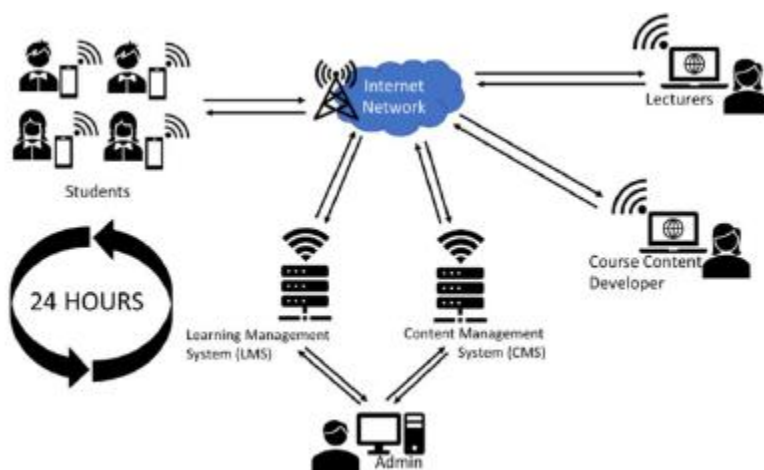


Figure 5. Mobile Learning Model of Nursing Schools inIndonesia

Students in the nursing programme may use the Instructional Management System (LMS) application to access learning materials. Lecturer explanation material, video material, assignments, and quizzes are all available for students to view. Access to all of this educational content is available around the clock. The LMS may be used in class by lecturers to provide additional resources for their students. It is up to a group of lecturers who have been trained by the programme director to create the course materials. Using the Content Management System (CMS), the lecture material team will upload course materials. Nurse school administrators will integrate CMS data to the LMS. He or she serves as a quality control officer for learning materials that are posted in CMS.

Software Development Life Cycle (SDLC) approaches that use the Agile (Scrum) model will be used to create mobile-based LMS and CMS apps. Figure 7 depicts the steps of this SDLC.

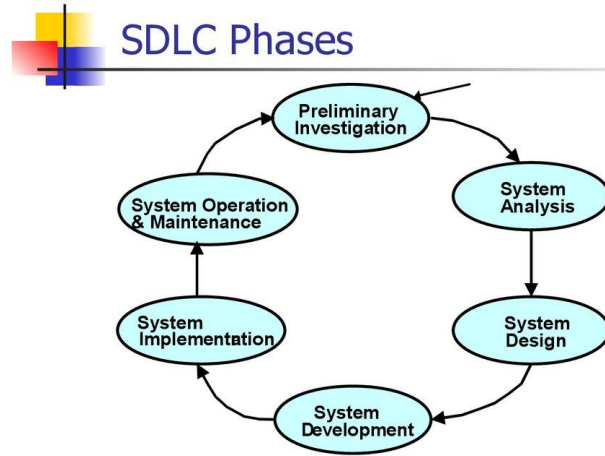


Figure 6. System Cycle (SDLC) flow chart

According to [13], a Scrum Development Model was used for research and development, and this model is represented in Figure 8.

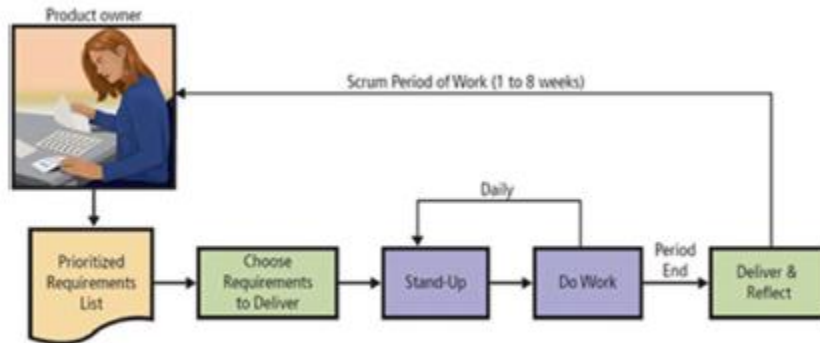


Figure 7. Scrum Diagram

In addition to the Login Menu, LMS features include:

1. 2. The Menu of Learning Materials
2. Menu for Video Instructional Training
3. Exercise and Task List
4. The Quiz Menu is shown here.

Software Development Life Cycle (SDLC) approaches that use the Agile (Scrum) model will be used to create mobile-based LMS and CMS apps. Figure 8 depicts the many phases of this SDLC.

Lecturers and nursing school students will both benefit from the menu feature in online learning. Students and teachers will be able to easily download course materials and media using a mobile-based LMS because of the little data size it uses.

Text Book Input Menu is one of the CMS menu functionalities.

1. 2. The Learning Material Input Menu
2. Learn more about how to use the video input menu
3. A menu for entering information about tasks and training
4. Menu for doing quizzes
5. The Verification and Review Menu
6. To use the CMS menu function, lecturers must be designated by the leader of the programme.

The content will be created by the lecturer and uploaded to the CMS by the professor. The leader of the study programme will conduct a thorough evaluation of all the material that has been submitted. This is done to ensure that students and instructors can access the information in the best possible way.

VII. Conclusion

Adequate human resources, particularly in the form of nurses, are a prerequisite for high-quality health care. The health education institution must have a great learning process in order to generate high-quality health workers. One way to accomplish the aforementioned goals is to move nursing education online and on mobile devices. More than half of Indonesians now access the Internet via their mobile devices, a significant shift from prior years. [5] This implies that Internet users already have a predilection for devices ranging from desktop and laptop computers to smartphones and tablets. Online learning is becoming more commonplace in the educational industry as a result of advances in technology and the use of mobile devices. It is proposed that students and faculty at the nursing school utilise and deploy a prototype of a mobile-based online learning system (m-LMS). Content Management System (CMS) and mobile Learning Management System (LMS) will be developed (m-LMS). The Agile (Scrum) software development life cycle (SDLC) will be used in conjunction with the mobile-based LMS and CMS application development process.

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