

Research Article

Mobile Learning-Based Cemis For Improving Learning Outcomes In Clinical Learning Among Nursing Students: Randomized Controlled Trial



Miming Oxyandi^{1*}, Santhna Letchmi Panduragan², Faridah Mohd Said³, Aris Citra Wisuda⁴, Rhipiduri Rivanica¹

¹Faculty of Health and Technology, Aisyiyah University Palembang-Indonesia

²Faculty of Nursing University of Cyberjaya, Malaysia

³Faculty of Nursing and Applied Sciences, Lincoln University College Malaysia, Malaysia

⁴Nursing Study Program, Sekolah Tinggi Ilmu Kesehatan Bina Husada, Palembang, Indonesia

Article Information

Received: 28 September 2025

Revised: 9 November 2025

Accepted: 20 January 2026

Available online: 31 January 2026

Keywords

Clinical Learning; Learning Outcomes; Mobile Learning; Nursing Students

Correspondence

Phone: :+6281373322553

E-mail: mimingoxyandi@unisa-palembang.ac.id

Website

<https://journal.umtas.ac.id/index.php/healthcare/index>

Doi

<https://doi.org/10.35568/healthcare.v8i1.7211>

©The Author(s) 2026

This is an **Open Access** article distributed under the terms of the Creative Commons Attribution-Non Commercial 4.0 International License

ABSTRACT

The quality of clinical Education is greatly influenced by students' success in clinical practice areas in achieving learning outcomes, most of which are still conventional and not yet integrated. This study aims to evaluate the effectiveness of mobile learning as a medium to assess clinical learning in nursing students. This study uses Randomized Controlled Trial design. Place and Duration of Study in IKesT Muhammadiyah Palembang. From Sept 2022 to May 2023. The sample for this research consisted of nursing students from Group Experimental (n=40) and control group (n=40). The types of analysis used were the Wilcoxon Sign Rank Test and N-Gain Score Test. The use of mobile learning-based CEMIS is proven to be significant and effective in improving the learning outcomes of clinical learning of nursing students with the results of the Wilcoxon Sign Rank Test in the experimental group and the control group, namely cognitive ability (Sysmp Sig 0.002 vs 0.057), Ability Psychomotor (Sysmp Sig 0.002 VS 0.057), ability Affective (Sysmp Sig 0.002 VS 0.057). Whereas the results of the N-Gain Score Test show ability cognitive 80% (Effective), ability Psychomotor 78% (Effective), ability Affective 78% (Effective). CEMIS-based nursing clinical learning has been proven effective in improving student learning outcomes, making it a potential alternative to support clinical learning in nursing education.

INTRODUCTION

Development knowledge increasing nursing knowledge and technology sophisticated, and besides That world of work requirements the more demand competent nursing staff in accordance with the times, so that the world of nursing education must capable prepare graduates who are competent to be able competition which is greatly influenced by success achievement learning nursing clinic by students. The learning process nursing clinic has goals and components that are important for nursing students to apply tiori, train skills, improve knowledge, attitude and develop professionalism of nursing students to achieve Learning Outcomes nursing clinic inside atmosphere real clinic (Amaral & Figueiredo, 2021; Bouchlaghem & Mansouri, 2018; Mathisen, 2023; Budury, Ainiyah, & Sari, 2023). According to the Association of Indonesian Nurse Education Center Learning (2020). Learning outcome standards clinical nursing is ability cognitive aspect the assessment; Pre Conference, Post Conference, Direct observational of procedural skills (DOPS), Student oral case analysis (SOCA), Mini Cex and Case Percentage. Evaluation Ability psychomotor aspect the assessment; Skill competency and evaluation ability Affective aspect the assessment; Attendance, Log Book, Tasks and Attitude.

Management learning Nursing clinics in Indonesia are currently partial Still Not yet accumulated by the use of E-Learning or Learning Management Systems (LMS). Quality guidance that is influenced by availability time mentor clinical / academic supervisors in the guidance process can be optimized by using e-learning which is designed to make the guidance process more effective through minimize activity stare advance between lecturers and students, while still ensuring the achievement of the competencies and learning process of the nursing clinic that has been determined (Harjanto & Sumunar, 2018).

Development or researcher Regarding the Learning Management System (LMS) or E learning based on mobile learning, it is still in the learning process Clinics in Indonesia are still limited among them . Research on the Learning Management System: Open for Knowledge Sharing (eLOK) which was developed become a learning medium education clinic that is flexible with appearance website or desktop based which needs to adapt to the mobile learning display (Harjanto & Sumunar, 2018). Meanwhile research on develop the I'M SMART application only limited to the assessment process for practical students clinic nursing profession during the learning process (Murdhiono & Siswanto, 2019). From the results of these 2 studies the learning media developed not yet mobile learning, not in accordance with learning outcome needs and not yet integrated . So that more research is needed carry on.

The learning process of an experiential nursing clinic is fully carried out by nursing students in hospitals, health centers, families and in the community. Therefore, it is necessary to have learning media based on Web Based Application (WBA) and Mobile APPs that can be accessed as information and communication media in an integrated and real-time manner in accordance with the learning achievements of nursing clinics consisting of aspects of cognitive ability, psychomotor ability and affective ability. The system developed should be digital-based because it has the advantage of being able to store data in a database, and with the support of digital technology, nursing and medical students have a positive attitude and are familiar with internet technology on laptops or smartphones or Mobile APPs (Mituhu, Dwiantoro & Kristina, 2021; Chalise at el, 2021). Mobile APPs have exponentially been used in almost all areas of life including in the world of Education, while interactive mobile apps in nursing education that are student-centered with systematic content are an effective and efficient method for

students to provide practical nursing skills experience (Masika et al, 2015; Kim & Suh, 2018). Because the use of Mobile learning has many advantages. Mobile learning is an effective and efficient learning method because it is student-centered and allows nursing students to learn and access information and communication anytime and anywhere because it is portable or Personal Digital Assistants (PDA) (Yalcinkaya & Yucel, 2023; Kim & Suh, 2018; Kenny et al., 2020).

The use of Mobile-based learning media in nursing clinic learning will facilitate the assessment process directly or in real time. So that it makes the nursing clinic learning media more effective, efficient and not limited by space and time. The use of mobile digital in nursing learning is to get the latest information in the clinic area about knowledge, techniques, skills, and research results as a valuable source of information in caring for patients. In addition, practicality, effectiveness, and efficiency are also alternative to professional learning models (Nur & Nuraeni, 2020). The use of android applications or mobile learning, is very helpful for nursing students to learn and also facilitates the clinical learning process, because it can monitor the learning process and assessment (Kim & Park, 2020). The use of mobile learning is more also helpful and satisfying in the learning process for nursing

students. This means that there have been efforts to implement or mobile learning in the learning process of nursing students, but there has been no research and application in the clinical learning process of nursing students (Mohamadirizi et al, 2021). Based on the above description, the importance of this research is carried out, because there has been no previous development or researcher about the Mobile Learning-Based Management Information System (MIS) which is in accordance with the learning outcomes of nursing clinic education as a learning medium that can facilitate the process of managing the learning process. This study aims to evaluate the effectiveness of mobile learning as a medium to assess clinical learning in nursing students.

METHOD

CEMIS application development using the ADDE Model. While The design of this study uses a Randomized Controlled Trial with a post-test pre-test design which aims to analyze the Effectiveness of Mobile Learning-Based CEMIS in the Clinical Learning Process Among Nursing Students with assessment aspects on Cognitive Ability, Psychomotor Ability and Affective Ability. As a guide for writing this study, the CONSORT (Consolidated Standards of Reporting Trials) 2010 is used.

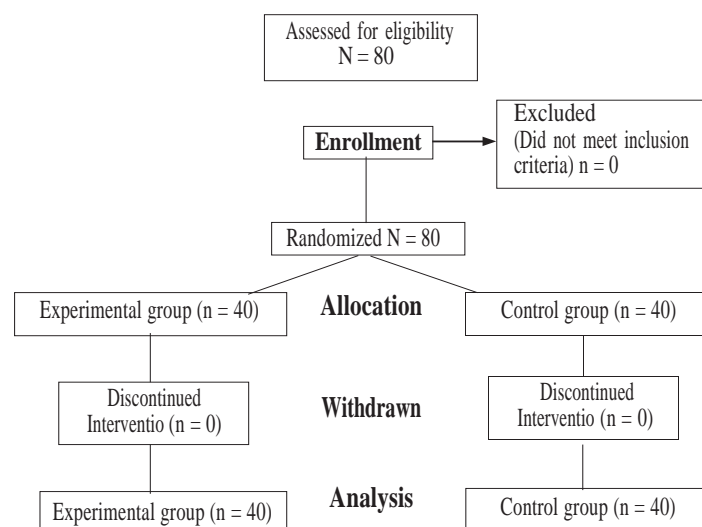


Figure 1: CONSORT Flow Chart of Participation Through the Trial

The sample of this study is nursing students who are in the learning area of the nursing clinic in one of the nursing study programs in the city of Palembang, Indonesia. The use of sampling techniques, namely Purposive Sampling with Inclusion Criteria: 1) Willing to be a respondent; 2) Nursing students who are in the process of clinical learning in the 2022-2023 academic year; 3) Nursing students who have an Android cellphone or iOS cellphone. Meanwhile, the number of research samples, namely the Experimental Group (n=40) with research interventions using nursing clinic learning media, namely CEMIS mobile learning, while the control group (n=40) with conventional learning media is only limited to using the WhatsApp Group (WAG) Application.

The process of collecting research data begins with the signing of an informed consent as proof of consent to become a respondent. The data collection process in the study with observation, interview and questionnaire (Pre Conference, Post Conference, DOPS, SOCA, Mini Cex and Case Percentage) methods aimed at obtaining data on learning outcomes of nursing clinic learning before and after research interventions consisting of cognitive ability, psychomotor ability and affective ability of nursing students in the clinical learning area with the data collection process including:

- 1) Evaluation Ability cognitive use feature Assessment with aspects Assessment : Pre Conference, Post Conference, DOPS, SOCA, Mini Cex and Case Percentage.
- 2) Evaluation Ability psychomotor use Competency features features that contain about the competency targets that must be achieved by

participants practice clinic. Format for achieving stage competencies consists from: List of competencies, Time (date and time), Choice of competency, Type achievement competency and scores obtained.

- 3) Evaluation Ability Affective use Attendance, Log Book, Tasks and Attitude features.
- 4) processing and data analysis were carried out researchers in accordance with the research objectives.

This research has through the Ethical Clearance examination process at the Commission Sriwijaya University Health Ethics Palembang, Indonesia on 02 December 2022 with protocol certificate of ethical approval number : 287-2022 with exempt status.

Analysis process in this research uses Kolmogorov-Smirnov as evaluation data normality. Meanwhile, the process for testing the effectiveness of CEMIS based on Mobile Learning using 2 types data analysis, namely the Wilcoxon Sign Rank Test with conditions $Asymp. Sig \leq 0.005$ (H_0 is rejected) while the N-Gain Score Test with the condition, if The N-Gain value ranges from 56% - 75% so it can be said Enough effective and if in the range $> 76\%$ then the model is used effective.

RESULTS

Clinical Education Management Information System (CEMIS) Based on Mobile Learning

CEMIS Based on Mobile Learning in learning nursing clinic is a Learning Management System (LSM) that can be used all over stage in learning nursing clinic that has 12 features (Figure 2).



Figure 2: Information System Management Education Clinic (CEMIS) Based on Mobile Learning

Figure 2 Provides Information; 1) Name of Student, 2) Name of Educational Institution, 3) Name of Clinical Practice Stage, 4) Nursing Clinical Practice Space, 5) Log Out, 6) Time For Clinical Practice, 7) The Button Selects The Stage, 8) Group Chat Feature, 9) Guide Book, 10) Gantt Chart, 11) Stase Verification, 12) Assessment, 13) Learning Outcomes, 14) Documentation, 15) Scientific Paper, 16) Home, 17) Log Book, 18) Absence, 19) Competence, 20) Task, 21) Stage Options.

CEMIS User Flow Based on Mobile Learning
 Mobile Learning Based CEMIS user flow is designed with a Mobile Learning based

Web Based Application (WBA) platform as a learning medium nursing clinic (Figure 3).

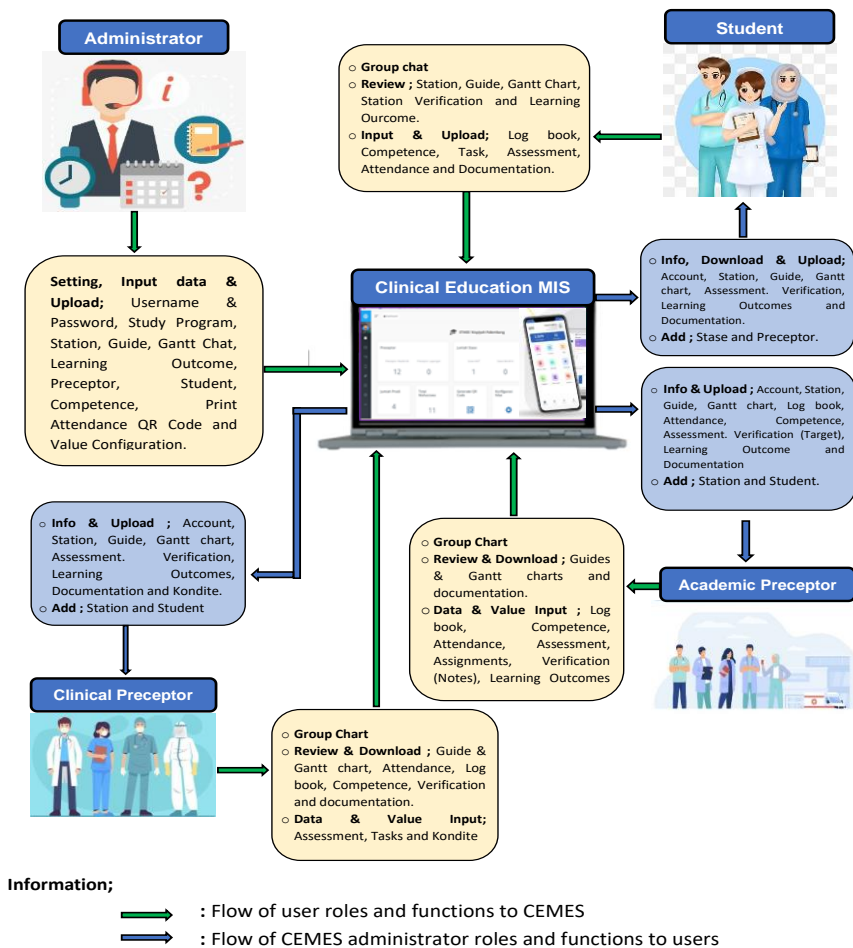


Figure 3. User Flow Mobile Learning Application CEMIS

Figure 3 explains the CEMIS user flow based on Mobile Learning above, explaining the roles and functions that the User flow Administrator or admin has Roles and functions for setting, inputting data and uploading include username, password, preceptor, student, study program, stage, guide, Gantt chat, learning outcomes, competencies, print QR code attendance and value configuration. Meanwhile, the academic preceptor has the role and function of storing, managing information, arranging and inputting grades and data about assignments, assessments, competencies and providing notes to students on the stage variation feature according to targets. Can access group chat as an online discussion medium between users, including students, academic preceptors and clinical preceptors. Next is

the user flow clinic preceptor has the role and function to organize and input values and data about tasks, assessments and conditions which are components of the assessment of attitude aspects which consist of aspects assessed including initiative, discipline, honesty, responsibility and cooperation.

Evaluation Process Clinical Learning uses CEMIS Based on Mobile Learning

Evaluation process learning clinic using CEMIS Based Mobile Learning consists of from Components ; Cognitive Ability Aspects, Psychomotor Ability Aspects, Affective Ability Aspects, Supporting Factors and Evaluation Results in Achievement learning clinics conducted by academic preceptors and clinic preceptors to students (Figure 3).

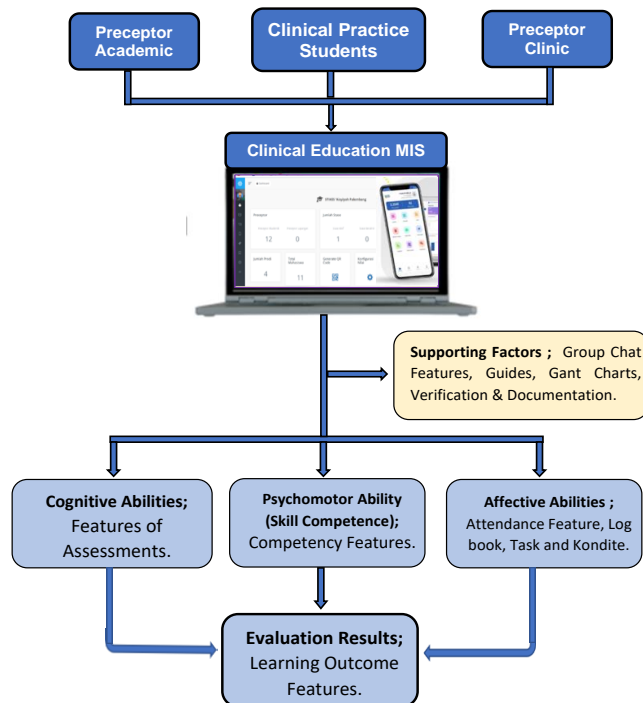


Figure 3: Evaluation process on CEMIS Based on Mobile Learning

Demographics Characteristics

Demographic data respondents in this study, in part Most of the students in the experimental group were on average 22 years old (70%) and the average age of the

control group was 23 years (65%). Whereas type sex part large number of students in the experimental group manifold Female gender 35 people (87.5%) whereas part Most of the students in the control group

were of the same type sex 30 women (75%). (Table 1).

Table 1: Distribution Frequency Characteristic Respondents (N=80)

Variable	Group Experiments (n = 40)		Group (n = 40)	
	f	%	f	%
Age, median, years	22	70.0	23	65.0
Sex				
Male	5	12.5	10	25.0
Female	35	87.5	30	75.0
Education				
Regular	38	95.0	38	95.0
Regular No	2	5.0	2	5.0

Effectiveness Test CEMIS Based on Mobile Learning on Learning Outcomes in Nursing Clinical Learning

Results of the effectiveness test of CEMIS Based on Mobile Learning on Learning Outcomes in Nursing Clinical Learning using the Wilcoxon Sign Rank Test before and after

application of Mobile Learning -Based CEMIS among nursing students with elements evaluation Ability Cognition (Pre-test, Post-test, DOPS, SOCA, Mini Cex, and Case Percentage) Ability Psychomotor (Skill Competency) and Ability Affective (Attendance, Log Book, Tasks and Attitude) (Table 2).

Table 2. Wilcoxon Sign Rank Test Learning Outcome Before and After Implementation CEMIS Based on Mobile Learning (N=80)

Variable	N	Mean Rank	Asymp. Sig (2-tailed)
Ability Cognitive			
Group Experiment	Negative Ranks	11 ^a	0.002
	Positive Ranks	25 ^b	
Group Control	Negative Ranks	9 ^a	0.057
	Positive Ranks	22 ^b	
Ability Psychomotor			
Group Experiment	Negative Ranks	13 ^a	0.011
	Positive Ranks	21 ^b	
Group Control	Negative Ranks	13 ^a	0.173
	Positive Ranks	20 ^b	
Ability Affective			
Group Experiment	Negative Ranks	10 ^a	0.005
	Positive Ranks	24 ^b	
Group Control	Negative Ranks	13 ^a	0.109

Table 2 shows Wilcoxon Sign Rank Test results in groups experiments and groups control is ability cognitive (Sysmp Sig 0.002 vs 0.057), Ability Psychomotor (Sysmp Sig 0.002 VS 0.057), ability Affective (Sysmp Sig 0.002 VS 0.057). The results of the Wilcoxon Sign Rank Test show the groups experiment proven can significantly improve achievement ability cognitive, ability psychomotor and abilities Affective by

using mobile learning in the area learning clinic compared with the control group. Whereas the results of the N-Gain Score Test are ability cognitive 80% (Effective), ability Psychomotor 78% (Effective), ability Affective 78% (Effective). These results show that use of mobile learning effectively can effectively improve ability cognitive area nursing students learning clinic (Table 3).

Table 3. N-Gain Score Test Before and After Done Intervention (N=80)

Variable		Percentage N-Gain Score (%)	Interpretation
Ability Cognitive	Before	80	Effective
	After		
Ability Psychomotor	Before	78	Effective
	After		
Ability Affective	Before	80	Effective
	After		

DISCUSSION

Clinical Education Management Information System (CEMIS) Based on Mobile Learning

Using CEMIS Mobile Learning in clinical learning, a student can interact and communicate in an integrated and real-time online manner between users, both students, academic preceptors and clinical preceptors on the group chat feature, access the clinic learning guide anytime and where on the Guide feature, students can review the practice schedule in a planned learning process on the Gant Chart feature. Students can do Attendance by scanning the QR Code, students record activities during the note-book-based clinic learning on the log book feature. Students can input data on the achievement of skill competencies and the results of competency achievement in real time can be known by the preceptor. Students can find out information instructions, instructions, deadlines, and grades

obtained through the assessment feature. Students can find out the frequency and completeness of documents that are in accordance with the clinical learning achievement target on the Verification feature.

Students can find out the results of the evaluation of clinical learning achievements which include assessments of cognitive ability, affective ability and psychomotor ability and students can upload document of clinical learning process activities as evidence-based assessment material. CEMIS Mobile Learning also supports the Go Gree program through literacy and Digital Archiving in the process of inputting log book data and skill competencies as well as soft copying of assignment documents and assessments of all loss papers with an automatic data storage method so that data is archived safely, and financially very efficient because students and educational institutions have applied the loss paper method both in filling
HealthCare Nursing Journal, Vol 8 No 1 | 87

in attendance, log book, skill competency targets, task collection process and score filling process and no longer printing guidebooks in manual form anymore, all accumulation activities in CEMIS based on Mobile Learning.

According to Indonesian National Higher Education Standards (2020). Learning Management System (LMS) is a system used to carry out the learning process by utilizing Information and Communication Technology (ICT) and systematically integrating learning components by paying attention to quality, learning resources and characterized by learning interactions (Engagement) across time and space as a learning medium. Instructional Media based on a learning management system (LMS) or E-Learning which is very interesting and effective for students and lecturers because easy accessible anywhere and anytime without obstacle time during connected to the network adequate and stable wifi/internet (Hastuti, Andriani & Rosita, 2022). Instructional Media E-Learning is also proven to have an influence achievement student competency and supporting student involvement participate actively and be more involved during the learning process, so that it can increase student competence (Jung et al., 2022; Gopinathan et al. 2022).

This Clinical Education Management Information System (CEMIS) is based on mobile learning with its main users These are clinical practice students who can access group chat, review and download, namely Stages, Guides, Gantt charts, Verification and Learning Outcomes. And students can input or upload log books, competencies, assessments, attendance and documentation. The CEMIS Mobile

Learning Application can be downloaded on Play Store or iOS, has 12 accessible features anytime and anywhere because it is portable or Personal Digital Assistants (PDA). So that have more user experience or interaction comfortable and enjoyable. Mobile Learning APPs designed specifically for mobile platforms (iOS, Android, or Windows Mobile). which has a user interface with mechanisms interaction unique provided by the mobile platform, interoperability with sources power website-based (Pressman dan Bruce, 2015).

Use of the Mobile Learning Application platform on CEMIS with sources Power website-based has Lots profit for academic preceptors, clinical preceptors and students because of long battery life and portability, has a better user experience or interaction comfortable and enjoyable. Availability possible learning process facilities with mobile-learning will produce atmosphere interesting learning, effective learning process, and influence results student learning (Ponamon, Tambingon & Rotty, 2022). The implementation of mobile learning applications has also proven to be very effective in improving academic and practical abilities clinic as well as own impact positive Because The technology offered is not limiting learning only on a face-to-face schedule face (Chandran et al. 2022; Rahmat et al., 2019).

Test the Effectiveness of CEMIS Based on Mobile Learning on Learning Outcomes in Nursing Clinical Learning

The effectiveness of Mobile Learning -Based CEMIS on Learning Outcomes in Nursing Clinical Learning in this study can be seen results evaluation learning nursing clinic that includes ability cognitive, Ability Psychomotor, abilities Affective in a way

Comprehensive by the preceptor. Academic preceptors can only input grades for attendance and log books for these students which consist of from assessment items, value, score and value end for each criteria evaluation stasis practice nursing clinic. Whereas mark final competency, assessment, tasks and Attitude will All calculated values are displayed in a way automatically by CEMIS Based on Mobile Learning. The learning process in the clinical teaching vehicle provides opportunities for the development of confidence and competence, both cognitive, affective and psychomotor competencies (Qodir and Christiana, 2018).

Evaluation of learning achievement is an evaluation carried out on the achievements that have been made by students during clinical practice, from here it will be determined whether the student meets the achievement target to be said to have passed the requirements or not (Ortiz et al., 2018). The application of mobile learning to nursing clinic learning has proven to be effective in increasing student learning outcomes in the clinical learning area, because the learning media used is more interesting, not limited by space and time and can be accessed anytime and anywhere because it is a Charm of Digital Assistants (PDA). Mobile learning-based learning has a positive impact because the technology offered does not limit learning that is only on a face-to-face schedule so that it is flexible, meaning that lecturers and students can choose a time and place to access and learn independently (Rahmat et al., 2019; Polly, 2021; Satsangi, 2022: Elvira at el, 2024).

This can make it easier to carry out supervision, monitoring and decision-

making quickly and appropriately in the nursing clinic learning process and is very financially efficient because students and educational institutions have applied the loss paper method both in filling in attendance, log books, skill competency targets, task collection processes and value filling processes and no longer printing guidebooks in manual form anymore, All accumulation activities in the dgital system. So that influence achievement of learning outcomes in Nursing Clinical Learning by nursing students.

1. Use of CEMIS Based on Mobile Learning Improvement Ability Student Cognitive Learning Outcomes in Nursing Clinical Clinical Learning

Usage CEMIS Based on proven mobile learning can effectively improve ability cognitive area nursing students learning clinic. This is in accordance with the results of the Wilcoxon Sign Rank Test and N-Gain Score Test in table 2 and table 3. Components evaluation ability students' cognitive abilities in Nursing Clinical Learning, namely Pre-test, Post-test, DOPS, SOCA, Mini Cex and Case Percentage⁴. Learning process mobile learning based nursing clinic using feature Assessment, students can find out type evaluation cognitive, deadlines and content information about evaluation ability cognitive abilities given by the preceptor. Then students upload files or documents related to the implementation evaluation ability student cognitive.

The Assessment feature is an assessment process on clinical learning evaluation activities for students, both summative and formative, carried out by academic and clinical preceptors. The grading of the learning process of the Nursing Clinic to students is carried out by academic
HealthCare Nursing Journal, Vol 8 No 1 | 89

preceptors in each assessment collected or uploaded by students. Assessment is the activity of interpreting measurement data based on certain criteria or rules or a process where information is obtained related to learning objectives (ANEIP, 2021). The component of assessing students' cognitive abilities is adjusted to the level of achievement of learning competencies in the nursing clinic. Cognitive assessment, also known as knowledge competency assessment, is an activity carried out to measure the level of achievement or mastery of students in the aspect of knowledge (Widoyoko, S. Eko Putro, 2012; Bob Kizlik, 2009). The application of android applications has proven to be very effective in improving academic abilities and clinical practice.

The researcher argues that the use of the Assessment feature in the process of assessing students' cognitive abilities is very helpful in the assessment of nursing clinic learning activities for students, both summative and formative, carried out by academic and clinical preceptors (Kleinpell, 2022). In this feature, students upload files or documents related to the implementation of cognitive assessments that contain instructions, preceptor information that assesses and grades obtained. Learning Mobile learning -based nursing clinics have a number of features that support the implementation process improvement ability students' cognitive abilities include group chat feature as a discussion medium in the evaluation process ability student cognitive. feature Gantt chart as a schedule of planned activities to achieve learning outcomes in the learning process clinic. As well as features verification for the activity monitoring process stage in accordance

with achievement targets nursing clinical learning.

2. Use of CEMIS Based on Mobile Learning Improvement Ability Student Psychomotor Learning Outcomes in Nursing Clinical Learning

The use of CEMIS based on mobile learning is proven can effectively improve ability Psychomotor of nursing students in the area learning clinic. This is in accordance with the results of the Wilcoxon Sign Rank Test and N-Gain Score Test in table 2 and table 3. Components evaluation ability Student psychomotor skills in Nursing Clinical Learning are skill competencies⁴. Using CEMIS based on mobile learning in improving ability Student psychomotor skills go through a process, namely selecting a Competency List, setting up time and competency level, then students type information on skill competencies in accordance with standards of care or SOP for appropriate skill competencies carried out. The process of assessing student competency by the academic preceptor, after the student inputs existing skill competencies If done, the academic preceptor can assess the student's skill competency by clicking on the section action with the "confirm" option (if in accordance with the target, level and SOP or competency care standards) and ignore or click "cancel" (if not yet in accordance with targets, levels and SOP or competency care standards).

Psychomotor assessment is an assessment process to find out the level of skill a person has which is carried out by looking at the movements that are carried out, either basic movements or movements that are done creatively. Competency is the ability to do something certain in order to achieve what is expected, this competence is also

HealthCare Nursing Journal, Vol 8 No 1 | 90

the knowledge and skills possessed by each individual that is applied in thinking and behaving where individuals will show true qualities in carrying out their tasks and work (Pueyo-Garrigues et al., 2022).

The application of mobile learning-based CEMIS in nursing clinic learning is part of System Management learning or E learning can affect the Psychomotor ability (Competency Skill) of nursing clinic practice students (Galvis & Carvajal, 2022). E-learning is a method of applying technology-based educational practices that focuses on helping students develop competencies of interest for personal and professional development. The application of the e-learning method in the learning process has an effect on improving student competence and learning quality (You, 2022). Researcher opinion that with the application of CEMIS based on mobile learning in learning Nursing clinics can improve ability Student psychomotor. That matter because through features of student activity competencies through bait come back and respond to achievement of competencies collected by the system so you can find out results achievement of competencies or scores achievement of competency in real time towards student activities through bait come back and respond to achievement of competencies collected by CEMIS is based on mobile learning so that the evaluation process is based on abilities Student psychomotor skills are implemented in a way effective and efficient, moreover supported by features supporter others such as the group chat feature which is a discussion medium in the skill competency evaluation process, the Gantt chart feature is a planned activity schedule for achieving skill competency in the learning process clinic. As well as a

Verification Feature for the activity monitoring process stage in accordance with the target of achieving skill competency in the Nursing Clinical learning process.

3. Use of CEMIS Based on Mobile Learning Improvement Ability Student Affectiveness in Nursing Clinical Learning Outcomes

The use of CEMIS based on mobile learning is proven can effectively improve ability Psychomotor of nursing students in the area learning clinic . This is in accordance with the results of the Wilcoxon Sign Rank Test and N-Gain Score Test in table 2 and table 3. Components evaluation ability Student psychomotor skills in Nursing Clinical Learning include attendance, logbook, assignments and ethics. Upgrade process ability Students' activeness in learning nursing clinic via usage a number of feature among them Attendance feature, Log Book feature, feature Tasks and features Attitude which is a student assessment process during learning clinic, which is assessed covers initiative, discipline, honesty, responsibility responsibility, and cooperation. Affective assessment is an assessment related to attitudes and values, this assessment includes behavioral traits such as feelings, interests, attitudes, emotions, and values (Castaldi et al., 2019). Concluded that mobile applications used as learning aids were positively optimized (Kusmaryani, Musthafa, & Purnawarman, 2019). The researcher argues that there are several features of CEMIS based on mobile learning that help improve the affective abilities of students, including the QR Code feature to find out the discipline of student attendance. The log book feature contains all activities carried out by students. The

assignment feature contains instructions and upload assignments consisting of individual and group assignments and the student assessment condite feature while in the practice which includes aspects of initiative, discipline, honesty, responsibility, and cooperation.

Apart from the above there are feature supporter towards the improvement process ability students' affectivity among them group chat feature as a discussion medium in the evaluation process affective between preceptors and students. The Gantt chart feature is a planned activity schedule that contains about achievements in learning outcomes nursing clinic. As well as features verification for the activity monitoring process stage in accordance with achievement targets clinical nursing learning with status fulfilled or not fulfilled. So the evaluation process is based on capabilities student affectivity can be implemented in a way effective and efficient.

This study has limitations, namely that the sample used to analyze the use of mobile learning on nursing students' learning outcomes in the clinical learning area was limited to one nursing college. Therefore, the findings cannot be guaranteed to be representative of other colleges, limiting the generalizability of the findings.

CONCLUSIONS AND RECOMMENDATION

Clinical Education Management Information System (CEMIS) Based on Mobile Learning as a learning medium Nursing clinics are developed according to the needs of learning outcomes nursing clinic (Cognitive Ability, Psychomotor Ability and Affective Ability) and has 12 features, namely : Assessment Feature, Competency Feature, Attendance Feature, Log book Feature, Tasks Feature, Group chat feature, Guide

book Feature, Gantt chat Feature, Verification stage Feature, Documentation Feature, Scientific Writing Feature and Leranng Outcome Features. Usage Clinical Education Management Information System (CEMIS) Based on Mobile Learning as a medium for managing learning processes, evaluating, interacting and accessing information online integrated and real-time with student users, academic preceptors and preceptors in the learning process nursing clinic has proven in a way can significantly and effectively improve good Learning Outcome ability aspect Ability cognitive, ability psychomotor and abilities affective effects on nursing students in the learning area clinic.

REFERENCES

- Alam, S., & Kizlik, B. (n.d.). *Compiled by Measurement, Assessment, and Evaluation in Education*. Available from: <http://drjj.uitm.edu.myMobile:+60193551621http://www.adprima.com/measurement.htm>.
- Bouchlaghem, M. A., & Mansouri, H. (2018). Exploration of the Gap between Theory and Practice in Tunisia Nurse Education System: A Cross-Sectional Descriptive Study with a Focus on Hand Hygiene. *International Journal of Nursing*, 5(1). <https://doi.org/10.15640/ijn.v5n1a3>.
- Budury, S., Ainiyah, N., & Sari, R. Y. Nursing Student Competency Achievement Factors In Clinical Learning. *Bali Medical Journal*. 12(3): 2878-2881. <https://doi.org/10.15562/bmj.v12i3.4348>
- Chandran, V. P., Balakrishnan, A., Rashid, M., Kulyadi, G. P., Khan, S., Devi, E. S., Nair, S., & Thunga, G. (2022). Mobile applications in medical education: A systematic review and meta-analysis. In *PLoS ONE*. 17 (3). Public Library of Science.

<https://doi.org/10.1371/journal.pone.0265927>.

- Christiansen, B., Averlid, G., Baluyot, C., Blomberg, K., Eikeland, A., Strand Finstad, I. R., Holm Larsen, M., & Lindeflaten, K. (2021). Challenges in the assessment of nursing students in clinical placements: Exploring perceptions among nurse mentors. *Nursing Open*, 8(3), 1069–1076. <https://doi.org/10.1002/nop2.717>.
- Elvira, M., Aulia, F., Hidayati, H., Arif, M., Dewi, D. S., & Sinthania, D. (2024). Developing a Clinical Learning Model to Improve Nursing Students' Learning Outcomes. *The Malaysian Journal of Nursing (MJN)*, 15(4), 43-50. <https://doi.org/10.31674/mjn.2024.v15i04.006>.
- Galvis, Á. H., & Carvajal, D. (2022). Learning from success stories when using eLearning and bLearning modalities in higher education: a meta-analysis and lessons towards digital educational transformation. *International Journal of Educational Technology in Higher Education*, 19(1). <https://doi.org/10.1186/s41239-022-00325-x>.
- Harjanto, T., Eko, S., Sumunar, W., Fkkmk, K., & Abstrak, U. (2018). Proseding Seminar dan Pembekalan Intensive Uji Kompetensi AIPNI Regional VIII 23-24 Februari. *Jurnal Keperawatan Respati Yogyakarta*, 5(1), 24. <http://nursingjurnal.respati.ac.id/index.php/JKRY/index>.
- Kim, H., & Suh, E. E. (2018). The Effects of an Interactive Nursing Skills Mobile Application on Nursing Students' Knowledge, Self-efficacy, and Skills Performance: A Randomized Controlled Trial. *Asian Nursing Research*, 12(1), 17–25. <https://doi.org/10.1016/j.anr.2018.01.001>.
- Kim, Y.-J., & Park, J.-H. (2020). Development and Use of the Nursing Management Application for Smartphones in Class. *International Journal of Advanced Smart Convergence*, 9(3). <https://doi.org/10.7236/IJASC.2020.9.3.36>.
- Kleinpell, R. (Ed.). (2022). *Outcome Assessment in Advanced Practice Nursing (5th ed.)*. New York: Springer Publishing Company, LLC. <https://doi.org/10.1891/9780826151261>.
- Kusmaryani, W., Musthafa, B., & Purnawarman, P. (2019). The influence of mobile applications on students' speaking skill and critical thinking in English language learning. *Journal of Physics: Conference Series*, 1193(1). <https://doi.org/10.1088/1742-6596/1193/1/012008>.
- Masika, M. M., Omondi, G. B., Natembeya, D. S., Mugane, E. M., Bosire, K. O., & Kibwage, I. O. (2015). Use of mobile learning technology among final year medical students in Kenya. *Pan African Medical Journal*, 21(1).
- Mituhu, A. P., Dwiantoro, L., & Kristina, T. N. (2021). Pengembangan Sistem Aplikasi Online untuk Penerapan Evidence Based Nursing Practice. *Jurnal Kepemimpinan Dan Manajemen Keperawatan*, 4(1). <https://doi.org/10.32584/jkkm.v4i1.839>.
- Mohamadirizi, S., Yazdannik, A., Mohamadi, M., & Omid, A. (2021). The effectiveness of two evaluation techniques in the clinical education field: A step for promotion of bachelor nursing student's satisfaction. *Journal of Education and Health Promotion*, 10(1). https://doi.org/10.4103/jehp.jehp_504_20.
- Murdhiono, W. R., & Siswanto, L. (2019). I'M SMART (Information Management System for Measuring Student

- Achievement in Real Time) Application Development in the PPP Student Assessment Process NERS. 1–9. In Proceedings of the Multidisciplinary National Seminar on Science, 1(1). <https://prosiding.respati.ac.id/index.php/PSN/article/view/22>.
- Na, Y. & R. Y. (2021). Effects of Peer-led Debriefing on Cognitive Load, Achievement Emotions, and Nursing Performance. *Clinical Simulation in Nursing*, 55(9). <https://doi.org/10.1016/j.ecns.2021.03.008>.
- Nur, Y. S., & Nuraeni, T. (2020). Using Mobile Technology in Continuing Nursing Education. *Jendela Nursing Journal*, 4(1), 7-12. <https://doi.org/10.31983/jnj.v4i1.5454>
- Ortiz, J., Hofler, R., Bushy, A., Lin, Y. L., Khanijahani, A., & Bitney, A. (2018). Impact of nurse practitioner practice regulations on rural population health outcomes. *Healthcare (Switzerland)*, 6(2). <https://doi.org/10.3390/healthcare6020065>.
- Polit, D. F., & Beck, C. Tatano. (2019). *Essentials of nursing research: Appraising Evidence For Nursing Practice*. Wolters Kluwer Health/Lippincott Williams & Wilkins.
- Polly, D., Recesso, A., & Hannafin, M. J. (2021). Considering How to Use First Principles of Instruction and Video Technologies to Support Teachers' Professional Learning in Mathematics Education 1 Considerando cómo utilizar los principales principios de la instrucción y las tecnologías de vídeo para apoyar el aprendizaje profesional de los maestros en educación matemática. *Revista de Educación a Distancia*. Núm, 68(2). <https://doi.org/10.6018/red.110421>.
- Pueyo-Garrigues, M., Pardavila-Belio, M. I., Canga-Armayor, A., Esandi, N., Alfaro-Díaz, C., & Canga-Armayor, N. (2022). nurses' knowledge, skills and personal attributes for providing competent health education practice, and its influencing factors: A cross-sectional study. *Nurse Education in Practice*, 58(1). <https://doi.org/10.1016/j.nepr.2021.103277>.
- Rahman, M. (2019). 21st Century Skill "Problem Solving": Defining the Concept. *Asian Journal of Interdisciplinary Research*, 2(1). <https://doi.org/10.34256/ajir1917>.
- Ramadhan, M. (2019). *Counseling Guidance Teacher Professional Competence at Mtss Alwashliyah Tembung*. (Doctoral dissertation, State Islamic University of North Sumatra).
- Satsangi, R. (2022). Video Modeling in Mathematics: Supplemental Instruction to Support Student Learning. *Intervention in School and Clinic*, 58(5). <https://doi.org/10.1177/1053451222114>.
- Smith, Y. (2021). Roles of a Nurse. *News Medical Life Sciences*. <https://www.newsmedical.net/health/Roles-of-a-Nurse.aspx>.
- Widoyoko, S. E. P. (2012). *Learning Program Evaluation*. Jember: Smart Tenacious Creative.
- You, W. (2022). Research on the Relationship between Learning Engagement and Learning Completion of Online Learning Students. *International Journal of Emerging Technologies in Learning*, 17(1), 102–117. <https://doi.org/10.3991/ijet.v17i01.28545>.