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Review

The Effectiveness of Blended Learning for Undergraduate Nursing Students: A Systematic Review

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Abstract

Introduction: Implementing conventional and online learning is considered insufficient to balance current educational needs, so blended learning is needed, combining the two learning methods to include more comprehensive learning. This study aims to systematically investigate the literature regarding the effectiveness of blended learning for undergraduate nursing students in Indonesia.

Methods: Systematic review by searching articles using CINAHL, PubMed, Science Direct, ProQuest, SINTA, GARUDA, manual search, and electronic search engine "Google Scholar," with full-text article criteria, articles that have been published since Blended Learning was carried out for nursing students using Indonesian and English articles, the keywords used are Nursing student, blended learning, the effectiveness of blended learning. The research design included a Randomized Controlled Trial (RCT) and a Quasi-Experimental Study.

Results: A total of 15 research articles, a Randomized Controlled Trial (RCT), A qualitative study, and a Quasi-Experimental Study that met the eligibility criteria, and all showed that blended learning can significantly help nursing student learning, including knowledge, clinical practice skills, learning content and instruction, learning reflection, and learning information media. There are differences in the results found from the use of media and learning materials provided and used.

Conclusion: Blended learning can be used as a learning reference because it is considered effective in carrying out the learning process in nursing.

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INTRODUCTION

The online learning model became known and used in the 1960s at open universities in England and the United States. The learning process is done through lectures and simulations that are made using video and then put on DVD and CD so that they can be played repeatedly [1][2]. Indonesia has also utilized information technology in the education process since 2012, as stated in the Regulation of the Minister of Education and Culture of the Republic of Indonesia number 24 of 2012, Implementation of Distance Education in Higher Education[3] [4].

Obstacles and challenges to learning were found that only relied on conventional or fully online learning. Of course, this requires a learning model that can cover more comprehensive aspects [5]. Limitations on time, individual student abilities, and other supporting access to learning materials will undoubtedly be the main obstacles to improving the quality of education [6].

Blended Learning not only provides maximum experience to students, but several other advantages tend to build the application of this Blended learning learning model. This can make it easier for students to access learning materials, improve the quality of the learning provided, and reduce costs incurred at any time [7]. Furthermore, the authors also found several systematic review research results related to blended learning in patients, clinicians, and other scientific students. This prompted the author to conduct a systematic literature review regarding the effectiveness of blended learning for undergraduate nursing students.

METHODS

Search Method

Searching for articles uses databases such as PubMed, CINAHL, EBSCOhost, and ProQuest. In addition, searches were also carried out using search engines such as ScienceDirect and Google Scholar. The researcher uses the Boolean Operator to broaden or limit the literature search with the following terms: "Nursing Student," "Blended Learning," and "Effectiveness of Blended Learning." The application to Indonesian is as follows: "nursing students," "mixed learning," and "the effectiveness of blended learning."

Inclusion and exclusion criteria

Research inclusion criteria are the type of source, namely primary resources or original articles, articles that are appropriate to topics related to the effectiveness of blended learning for nursing students, articles that can be accessed in full-text and published in reputable and indexed national and international journals, using Indonesian or English, published articles within the last 6 years (2016-2022).

Article Screening

Article screening was carried out by three reviewers who independently assessed all titles and abstracts of articles obtained by the search method to identify papers that met the inclusion and exclusion criteria. Each article finding will be scored, and if there is a difference in scores, the three reviewers will carry out a careful discussion and re-

examination.

Data Extraction

The author will perform data extraction with the help of Microsoft Excel and Mendeley Bibliography Software. The data extracted consisted of the name and year of the article published, the country, the journal of the article publication, the design used, the study sample size, the study's purpose, and the study results. The synthesis results are presented in Table 1.

Quality Assessment

Each of these JBI checklists consists of several questions with answer choices in each section, namely "*yes*," "*no*," "*Unclear,"* and "*Not Applicable* (*NA)."* Every answer *Yes* is given a score of 1, after which the score can be calculated. The quality of each piece of literature will be assessed independently by three reviewers, namely the researcher and the two supervisors. If there is a difference in scores, then the third reviewer will discuss and agree on the outcome. For each article, the total score will be calculated, and the Systematic Review will include those that meet or exceed a cut-off score of 50%.

Data analysis

The data synthesis method that will be used in this Systematic Review is a narrative approach. Each article will be reviewed and analyzed narratively to obtain data following this Systematic Review's objectives.

Table 1

Summary of Article Study Results

Researcher, Year	Participants (setting, number, and sample criteria)	Intervention Group (Types of media, description, and application of the intervention)	Control Group	Blended Learning Effectiveness	Results
(Moon & Hyun, 2019)	*Settings:* Sangmyung University Institution. Sample criteria: age 20-22 years. Nursing students who have given their written consent to participate in this study, have not completed an emergency department training course, and have not previously received blended learning CPR Education.	Media type: using video for standard CPR (Cardiopulmonary Resuscitation) education programs." Intervention description and application: The CPR Education Program, implemented using the blended learning method, is designed as a program of 4 (four) sessions. In session 1, a program orientation is given. In session 2, students watched a video entitled "How to Perform Chest Compression CPR and Use an Automated Defibrillator."	*Printouts* containing CPR guidelines were given to the control group, which only had a 90-minute lecture.	In this monocentric study, the CPR blended learning program integrates video and face-to-face lectures, effectively increasing nursing students' knowledge and attitudes about CPR.	*Outcomes:* Integrating CPR learning videos effectively increased CPR knowledge and emotional attitudes, but not behavioral and cognitive attitudes or self-efficacy. Obtaining the mean values of several variables after receiving CPR Education with the blended learning method (intervention group vs control group), among others. Knowledge: the CPR knowledge score after the study in the intervention group increased significantly from 7.98 (SD=3.32) to 16.40 (SD=1.56), while in the control group, it decreased from 6.63 (SD=2.76) to 6.47 (SD=2.63).

(Chung et al., 2022)	*Settings:* Nethersole School of Nursing, The Chinese University of Hong Kong. Sample criteria: 1. Hong Kong residents who can speak Cantonese (Cantonese) and read Chinese as well as English 2. Be at least 18 years old. 3. Never enrolled in a clinical handover training program.	Media type: using the online module in clinical handover training. Intervention description and application: Researchers assessed 178 final-year 2019 academic nursing students for eligibility, and 96 enrolled in the study were randomly assigned to either the intervention or control group.	The same intervention was received after data collection was completed.	This research demonstrates the efficacy of the blended learning approach in increasing skill competency, communication, and self-efficacy of final-year nursing students in conducting clinical handovers.	*Outcomes:* Using a blended learning approach for clinical handover is an innovative teaching strategy that can increase the competency skills of nursing students, improve the quality of nursing care, and promote patient safety. Mean self-efficacy scores of both groups at baseline after the intervention. The researchers found a statistically significant increase in self-efficacy scores for both experimental groups, $t(47) = 18.70$, $p < 0.001$, $\eta 2 = 0.88$, and for the control group, $t(40) = 16.90$, $p < 0.001$, $\eta 2 = 0.88$, at 2 weeks after the intervention, regardless of the intervention received.
(Zhang, Zhou, & Li, 2022)	*Settings:* department of nursing, Harbin Medical University. Sample criteria: The researcher randomly selected each student from two classes and allocated them to the intervention group (n = 64) and the control group (n = 59) with a closed envelope system, with two points given (1 for control, 2 for intervention).	Media type: using video media. Intervention description and application: The test papers were determined by instructors independent of the study; the total score was 100 points, covering objective topics (single choice and multiple choice questions) and subjective issues (short answer questions, medical record analysis topics). When the test was carried out for 90 minutes, both groups of students received the same test paper.	The control group was given conventional learning (face-to-face)	In this study, the mixed teaching mode was based on an interaction and engagement framework cognitive in connectivism learning applied to obstetrics and gynecology nursing courses, which achieves a good teaching effect, effectively improves students' core abilities nursing and fostering independence.	*Outcomes:* The blended learning mode implemented in obstetrics and gynecology studies achieves a good teaching effect, effectively improves the core abilities of nursing students, and develops nursing students' independent learning abilities. The control group's theoretical test score was 75.43 (5.22), and the intervention group scored 77.25 (4.53). A paired t-test was used to compare the scores of the two groups, and the difference was statistically significant ($t = 2.57$; $p < 0.05$).
(Yu et al., 2021)	*Setting: Nursing School of Fujian Medical University* Sample criteria: Class 1 has 164 students with eight groups, and Class 2 has 131 students with seven groups. Each group consists of approximately 20 participants. The medical treatment course starts in the fourth semester, a year and a half after they enter university.	The type of media used Zhengfang software. Intervention description and application: Two labels numbered 1 and 2 are placed in an opaque envelope. The administrator asked one of the medical nursing teachers to select and open envelopes randomly. Since "number 1" is chosen, class 1 will be the experimental class, while class 2 will be the control class.	The control class underwent case-centered offline learning for two semesters through traditional face-to-face lectures and seminars.	Using blended case-centered learning shows promising results in improving student academic achievement. Mixed case-centered and offline learning is an effective educational approach to improve the critical thinking skills of undergraduate nursing students. It can be applied to other nursing subjects in the future.	The results of the study confirmed that students' academic achievement was improved by applying blended case-centered learning. In this study, case-centered blended learning and offline learning are appropriate educational approaches to improve the critical thinking skills of undergraduate nursing students.
(Durmaz et al., 2012)	*Settings:* nursing school in western Turkey. Sample criteria: This study was conducted among sophomore undergraduate nursing students (N = 90) from nursing schools in the fall 2009-2010 academic year.	Media types: In SBCS, preoperative and postoperative care management is explained through textual information, images, flowcharts, tables, sample cases, and videos. Intervention description and application: Web-based SBCS. Its contents are the management of preoperative	The control group consisted of eight psychomotor steps for breathing exercise education skills in practice. The student's skill level was assessed using a checklist in the	Knowledge scores of students receiving management Preoperative and postoperative patient care in SBCS is similar With students who received an education in SL. There is no significant differences between students' skills in deep breathing exercises and coughing exercises.	*Outcomes:* There was a gradual development after the study was conducted in the intervention and control groups. The pre-test score of students who received education at SBCS was 47.07 (SD, 8.13), and students who were educated at SL (Skill laboratory) were 50.43 (SD, 8.03). No statistically significant

		and postoperative care.	objective structured clinical examination (OSCE).	However, there are significant differences in patient admission complex skills in a surgical clinic after the operation.	difference was found between the groups (P = .063; p. 9.05). There was a statistically significant difference between the post-test scores, but it was not detected students' post test knowledge scores (P = .421; p. 9 .05).
[11]	*Setting: School of Medicine, National University of Singapore;* Sample criteria: data were collected from August 2016 to November 2016 from 124 undergraduate nursing students from leading nursing schools. *Convenience sampling was* adopted to recruit all enrolled first-year nursing students.	Type of media: using virtual learning by utilizing PowerPoint, multimedia, and videos Intervention description and application: This module was redesigned as a form of blended learning and introduced to participants for 13 weeks (one semester).	Using WhatsApp and Dropbox group chats to produce a short video as one of their assessments of the scenarios provided	Padadogi learning blended learning can effectively facilitate module communication and improve learning outcomes among nursing graduates. This also needs to be considered, so that technology needs to be improved by involving more interactive activities to accommodate the needs of students.	*Outcome: Blended Learning Pedagogy (BLP)*used in redesigning the communication module for undergraduate nursing increased participants' satisfaction level and self-efficacy. The statistically significant mean score obtained from BLSS from pre-test (M = 59.62, SD = 12.67) to post-test (M = 129.76, SD = 304.49), t ((122) = -2.55, p = 0.012(two-tailed) The mean difference between the two scores is -70.14, with a 95% confidence interval ranging from -124.56 to -15.72
[12]	*Settings:* Southern Taiwan University Sample criteria: 111 nursing students with the following criteria: 1. Majored in nursing 2. Took a pharmacology course 3. Have their cell phone and can receive text messages 4. Agree to participate in research.	Media type: short message (SMS) Intervention description and application: All students in both groups had regular lectures on these drugs. To enhance student learning, the researchers developed SMS medicine learning materials based on the medicines taught in lectures. The SMS learning content includes the most essential information, such as drug name, drug action, clinical use, side effects, and contraindications	Lectures received are the same, but without using SMS	These results indicate that the provision of material learning through SMS can significantly increase the medical knowledge of nursing students.	*Outcomes:* The results of this study demonstrated a statistically significant increase in medication knowledge scores over time among students who received SMS learning materials. The mean value obtained from the results of this study is that after the SMS intervention, the average score on MKQ in the experimental group increased from 8.92 (out of a possible 20) points at baseline to 13.46, 13.33, and 12.4 points at one week, two weeks and four weeks, respectively, after the intervention.
(Zarshenas et al., 2022)	*Settings:* Shiraz University of Medical Sciences. Sample criteria: This study is an intervention study with a pretest-posttest design conducted on 46 Shiraz Nursing School nursing students studying in the second semester of the 2021 academic year and currently undertaking a public health internship.	Media type: Mixing the use of learning with the help of video clips and WhatsApp. Intervention description and application: The students were selected according to inclusion criteria. Written consent was obtained from all students while the research objectives were still being stated. In this study, students were enrolled using the census method and were randomly divided into two groups: intervention (n = 21) and control (n = 25).	Using the Education method of routine lectures, questions, and answers without video assistance.	*Micro-learning is* an effective training method to improve learning outcomes and self-efficacy among nursing students, especially in internship units. This method is recommended due to multimedia concerns that affect all students' learning styles and affect students' learning outcomes and self-efficacy.	*Outcomes:* The results of the independent efficacy test revealed that traditional training methods had no significant effect on student self-efficacy. In contrast, distance classes using micro-learning content significantly affected nursing students self-efficacy. The results showed no difference in the average score of the control group's level of self-efficacy before and after the training course, which was not statistically significant, with a p-value of 0.425.

(Zarshenas et al., 2022)	*Settings:* nursing students in Spain. Sample criteria: A sample of 120 students was collected after the third year of their nursery degree in Spain (the degree has four years) for one semester (9 weeks): 63 participants followed the Blended Learning methodology type 1, and 57 participants followed the Blended Learning methodology type 2.	Media type: application used by mixing blended learning methods. Intervention description and application: *Convenience sampling was* followed for sample selection. This is due to the possibility of working with this methodology by a specialist teacher attending both groups and in this way, the "teacher type" effect is avoided.	*Blended learning* type 2, where student and teacher interaction is 20% LMS and 80% F2F	It seems blended learning is implemented in the Learning Management System (LMS) with hypermedia resources that better support the achievement of effective learning.	*Outcomes :* This research study has identified characteristics for designing an effective LMS for a nursing degree. Predictive and clustering techniques are essential to facilitate personalized learning and analyze how resources are better utilized in blended learning spaces. The mean scores differed significantly between the two groups (experimental and control) in their use of metacognitive strategies analyzed before applying the various types of blended learning (Type 1 vs. Type 2).
(Alshawish et al., 2021)	*Settings:* State University in Palestine Sample criteria: Students freely enroll in mixed teaching sections (49 students) or traditional classrooms (53 students). The teaching methods for each section are assigned after registration.	Media type: involves the use of video in online learning. Intervention description and application: The blended learning section has two hours of face-to-face teaching and online activities. Online activities include assignments and questions, answers, and comments via discussion boards. The traditional section has three hours of face-to-face teaching time. In addition, students have access to video courses through the learning management system.	Using traditional learning without involving videos.	Student Perceptions of Learning and Student Perceptions of Teachers were significantly higher for students taught in blended learning methods compared to traditional classroom settings.	*Outcomes:* There is an increase in the use of blended learning and a high level of satisfaction. There was no significant difference in the acquisition of mean scores between blended learning and traditional learning in first, second, and final test scores and total course GPA with and without assignment scores. However, students taught in the blended learning format scored significantly higher on the assignment (M = 91.38, SD = 6.04) than students in the traditional classroom setting (M = 87.97, SD = 5.68); t(100) = 2.94, p = 0.004.
(H. Moradimokhles and G. J. Hwang, 2022)	*Setting:* Medical University of Asadabad, Hamadan Sample criteria: the participants were assigned on a random (systematic random sampling1) to three groups of 20 students (each group included 10 male and 10 female nursing students). The age range of the participants was between 20 and 22 years old.	Media type: Commu- native language teaching (CLT) Intervention description and application: CLT is an approach to language teaching that emphasizes interaction as the means and the ultimate goal of study. Language learners in environments utilizing CLT tech- Unique learn and practice the target language through interaction with one another and the instructor.	The first experimental group (online group) received the same instruction on the four English language skills from the instructor with the LMS instructional model (the LMS model was discussed in the introduction section).	The goal of formative assessment is to monitor student learning to provide ongoing feedback that instructors can use to improve their teaching and for students to improve their learning. More specifically, formative assessments help students identify their strengths and weaknesses and target areas that need work, and also, instructors recognize where students are struggling and address problems immediately.	These results have pedagogical implications for curriculum designers, the development of training programs for future nurses, material producers, and all involved in nursing education. Statistical analysis was done for the individual pre-test and post-test scores of all 60 participants for The correlation, r = .926 ($p < .001$). The repeated measures one-way analysis of var- iance showed a signi cant e ect of group, $F(2, 57) = 4.85$ ($p = .030$, $p\eta 2 = .730$). The control group's overall post-test scores were roughly the same as those of the scores they received in the pre-test.

(D. N. Al-Osaimi and M. Fawaz, 2022)	Setting: a major university in Saudi Arabia Sample criteria: The approached students were from the second, third, and fourth years of a 4-year academic nursing program. The inclusion criteria also state that the students were not enrolled in other programs in a different field of study or have recently transferred to the nursing program	Media type: blended learning Intervention description and application: The students have been attending blended learning for the past two years. Those who were interested and qualified were invited to respond to the email within two weeks.	The examination included recounting direct quotes from respondents, open-text labeling, and categorization, resulting in the Identification of new themes	The need for such coping yielded higher motivation to learn in the blended environment, as once they got used to it, they felt more encouraged to navigate and study.	This study's sample comprised 20 student nurses, 11 (55%) female, while 9 (45%) were male. Their age ranged from 21 to 25 years old, where 6 (30%) were second-year students, 4 (20%) There were third-year students, and 10 (50%) were fourth-year students.
(C. Tørris et al. 2022)	Setting: Oslo Metropolitan University Sample criteria: they were recruited in the second semester, and the only eligibility criterion was being a nursing student taking the APB exam in December 2020	Media type: using an anonymous electronic survey created in Nettskjema Intervention description and application: The questionnaire was distributed to all first-year nursing students in the bachelor's degree program at Oslo Metropolitan University (N = 670), registered as active students in the 2020 APB course.	Students worked in small groups of 3–5, supervised by the teacher and student assistants, while solving the seminar tasks.	This study found a linear association between students' perceived learning outcomes and grades achieved. The high ratings of the perceived learning outcomes in active learning seminars were positively associated with grades. Active learning is critically important for students' learning because it creates an environment supporting their learning process.	A significant linear relationship between overall perceived learning outcome and grade achieved was found (B 0.644, 95% CI 0.52 to 0.77). Of the different learning activities, attending digital seminars was positively associated with grades (B 0.163, 95% CI 0.002 to 0.32). Participating in a voluntary colloquium group (B 0.144, 95% CI 0.03 to 0.26) and motivation to learn (B 0.265, 95% CI 0.13 to 0.41) predicted the students' grades. Intrinsic motivation was positively associated with grades (B 0.285, 95% CI 0.12 to 0.45), and extrinsic motivation was negatively associated with grades (B-0.213, 95% CI-0.35 to -0.07). Nursing students' perceived learning outcomes and grades were positively associated.
(Y. Yoshida et al. 2022)	Setting: Making an occupied bed was initially programmed as part of professional nursing education. At the university where this research was conducted, specialized nursing education begins in the second year.	Media type: video Intervention description and application: The first author conducted the interviews using the interview guide and met the participants for the first time during the interview, despite being a nursing faculty member.	Eleven female nursing students, all in their 20s and eligible for the study, responded.	Our study described changes in nursing students' cognitive processes when acquiring psychomotor skills through blended learning, focusing on making an occupied bed. After an inductive content analysis of interview data, six categories related to these cognitive changes were identified. Nursing students' learning began with a focus on partial results.	Six categories related to changes in participants' cognitive processes while acquiring the skill of making an occupied bed were identified: "feeling that it is easy to acquire," "practicing without much thought," "realizing the difficulty in translating thoughts into practice," "experiencing a sense of purpose in each technique," "gaining a perspective to evaluate one's skills," and "developing one's unique approach."

(S. Supriatin et al, 2022)	Setting: STIKes Cirebon, Indonesian Sample criteria: In this study, a blended learning intervention was given to one group to see whether or not there were changes related to the problem of physical examination abilities before and after treatment.	Media type : Video, Simulation, audio, images Intervention description and application: The technique uses purposive sampling and the N-Gain value analysis. The result shows a significant difference in the competence of the physical examination before and after using the blended learning method.	A sample of 100 DIII Nursing students. The sampling technique uses a purposive sampling technique and the N-Gain value analysis of the effectiveness of blended learning	The blended learning method is proven effective in increasing the competence of the physical examination of nursing students.	84% of nursing students cannot perform a physical examination. After intervening using the blended learning method, it decreased to 0%. Nursing students' satisfaction with using blended learning methods in physical examinations. 75% of nursing students stated that they were very satisfied. 16% of nursing students stated that they were satisfied. 9% of students stated that they were quite satisfied. .

RESULTS

Study Selection

An article search of the entire database obtained 2,116 articles. All obtained articles are then entered into Mendeley's citation manager to check for duplicate articles using the Tools menu component "Check for Duplicates" available in the application's menu service. Based on the identification results, the number of articles that will be reviewed in this study, based on findings from each database (PudMed, ProQuest, CINAHL, and EMBASE), obtained 8 articles, and are reputable journals because an examination has been carried out on the Scimago Journal Rank (SJR).

Article search on hand search/ online search (Google Scholar and Science Direct) found 198 articles. Seven articles were obtained with a reputation because a final examination was carried out through an examination on *Scimago Journal Rank* (SJR). The filtering or selection of appropriate literature for the researcher will be summarized using the PRISMA diagram (Figure 1). The following is the PRISMA flow chart to summarize the literature selection in *Systematic Review* [24].

Assessment of Literature Quality and Risk of Bias

Assessment of quality and risk of article bias used The Joanna Briggs Institute (JBI), specifically for Randomized Control Trials and Quasi-Experimental Studies. Three reviewers carried out this assessment, namely the two supervisors and researchers, without a team of researchers/reviewers selected from outside. The results of evaluating the quality of the articles can be obtained in Table 2.

Characteristics of Articles and Respondents

The research articles included in this systematic review were all published in English, with 1,207 respondents consisting of 214 men and 993 women. The research design consists of randomized control trials

(RCTs) and quasi-experimental studies, but one study still forms a cluster of randomized controlled trials. The age range of respondents is between 16-25 years. The results of the evaluation of the characteristics of the articles and respondents are shown in Table 3.

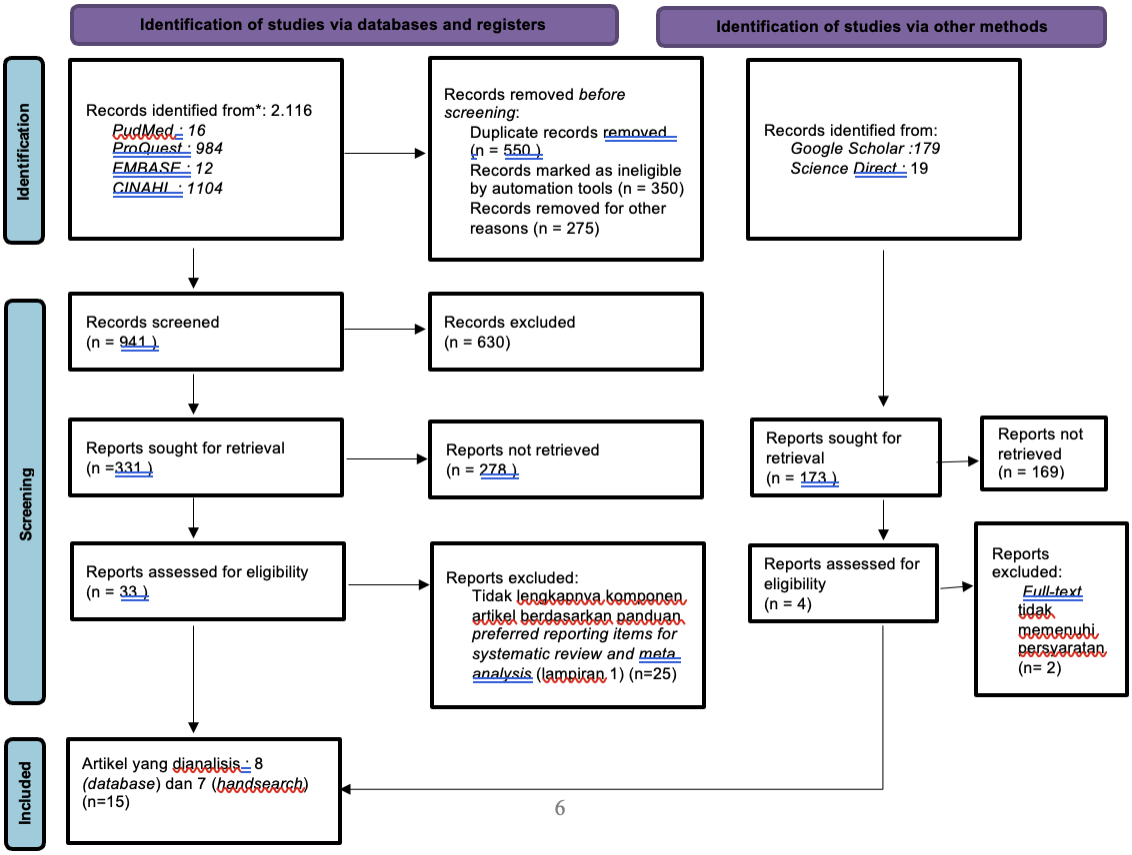

Fig. 1. PRISMA Flow Diagram of Trial Selection Process for Critical Reviews

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71. For more information, visit: http://www.prisma-statement.org/

Table 2

Assessment Result Using JBI Creative Appraisal Tools

No	Author, Year	Research design	Team			∑ Average
			*Reviewer*1	*Reviewer*2	*Reviewer*3	
1.	(Moon & Hyun, 2019)	RCTs	8/13 x 100% = 62%	10/13 x 100% = 77%	11/13 x 100% = 85%	75%
2.	(Chung et al., 2022)	RCTs	9/13 x 100% = 69%	10/13 x 100% = 77%	10/13 x 100% = 77%	74%
3.	(Zhang, Zhou, & Li, 2022)	RCTs	10/13 x 100% = 77%	11/13 x 100% = 85%	11/13 x 100% = 85%	82%
4.	(Yu et al., 2021)	Cluster-RCT	8/13x 100% = 62%	9/13 x 100% = 69%	10/13 x 100% = 77%	69%
5.	(Durmaz et al., 2012)	RCTs	8/13x 100% = 62%	9/13 x 100% = 69%	11/13 x 100% = 85%	72%
6.	[11]	*Quasi-Experimental Study*	8/9x 100% = 89%	8/9x 100% = 89%	8/9 x 100%= 89%	89%
7.	[12]	*Quasi-Experimental Study*	7/9x100% =78%	7/9 x 100% = 78%	8/9x100% =89%	81%
8.	(Zarshenas et al., 2022)	*Quasi-Experimental Study*	8/9x 100% = 89%	9/9x 100% = 100%	8/9 x 100%= 89%	92%
9.	(Sáiz-Manzanares et al., 2020)	*Quasi-Experimental Study*	9/9 x 100% = 100%	9/9x 100% = 100%	8/9 x 100% = 89%	96%
10	(Alshawish et al., 2021)	*Quasi-Experimental Study*	7/9 x 100% = 86%	8/9x 100% = 89%	9/9 x 100% = 100%	91%
11	(H. Moradimokhles and G. J. Hwang, 2022)	*Experimental Study*	8/9x 100% = 89%	9/9x 100% = 100%	8/9 x 100%= 89%	92%
12	(D. N. Al-Osaimi and M. Fawaz, 2022)	*A Qualitative Study*	9/13 x 100% = 69%	10/13 x 100% = 77%	10/13 x 100% = 77%	74%
13	(C. Tørris et al. 2022)	*Cross-Sectional Study*	10/13 x 100% = 77%	11/13 x 100% = 85%	11/13 x 100% = 85%	82%
14	(Y. Yoshida et al. 2022)	*A Qualitative Study*	9/9 x 100% = 100%	9/9x 100% = 100%	8/9 x 100% = 89%	96%
15	(S. Supriatin et al, 2022)	*A Quasi-Experimental study*	8/13 x 100% = 62%	10/13 x 100% = 77%	11/13 x 100% = 85%	75%

Table 3

Characteristics of articles and respondents (n=10)

Author, Year	Country	Research design	∑ Sample (Person)	Type Sex(M/ F)	Age Mean ± SD (Int/Con)
(Moon & Hyun, 2019)	South Korea	RCTs	120	20/100	21.18 ± 1.08/ 21.27 ± 1.16
(Chung et al., 2022)	China	RCTs	89	11/78	23.50±1.41/ 23.34±0.97
(Zhang, Zhou, & Li, 2022)	China	RCTs	123	22/101	24.34±5.22/ 24.25±4.53
(Yu et al., 2021)	China	Cluster-RCT	295	35/260	Statistical average is not mentioned.
(Durmaz et al., 2012)	turkey	RCTs	82	8/74	Average age 20.5±1.1
[11]	Singapore	Quasi-Experimental Study	124	16/108	The mean age was 19.54±1.11 with a range of 18-23 years
[12]	Taiwan	Quasi-Experimental Study	106	7/99	16.48±0.54/ 16.7±0.54
(Zarshenas et al., 2022)	Iran	Quasi-Experimental Study	46	14/32	Under 25 years old
(Sáiz-Manzanares et al., 2020)	Spanish	Quasi-Experimental Study	120	33/87	23.26±2.56/ 24.67±4.12
(Alshawish et al., 2021)	USA	Quasi-Experimental Study	102	48/54	20.37±0.88/ 20.49±0.95
(H. Moradimokhles and G. J. Hwang, 2022)	Taiwan	*Experimental Study*	60	19/41	Statistical average is not mentioned
(D. N. Al-Osaimi and M. Fawaz, 2022)	Saudi Arabia	*A Qualitative Study*	20	5/15	Under 23 years old
(C. Tørris et al. 2022)	Norwegia	*Cross-Sectional Study*	230	44/186	Statistical average is not mentioned.
(Y. Yoshida et al. 2022)	Japan	*A Qualitative Study*	20	7/13	24.34±5.22/ 24.25±4.53
(S. Supriatin et al, 2022)	Indonesia	*A Quasi-Experimental study*	50	10/40	Statistical average is not mentioned
TOTAL			1.587	299/1288	

DISCUSSION

Learning Effectiveness Blended Learning For Nursing Students

Knowledge

Four articles explain that utilizing blended learning effectively increases nursing students' knowledge. The learning methods used vary and are carried out at different times [23],[14],[21],[16]. These five research articles explain that carrying out the learning process involving videos will undoubtedly positively impact students. This is because time is more efficient and learning materials are also more interesting and easy to understand. Compared to the knowledge intervention, the control group received learning without the help of application media or video.

Clinical Practice Skills

Two articles demonstrate that learning blended learning is effective in carrying out nursing students' clinical skills. The methods and learning materials provided varied, but the research focus achieved was centered on the clinical practice skills of nursing students before going to the hospital [9], [10][16]. This study's learning intervention group, blended learning, received the module online as a learning reference before implementing clinical practice trials. In increasing the value of effectiveness in clinical practice learning, blended learning can, of course, be an access to learning that can facilitate student understanding [27].

Learning Content and Instructions

Two articles explain learning using blended learning is effective in the continuity of nursing learning because the content and learning instructions can be well received by every student [17],[22][20] Combined learning content and instructions with blended learning has an implementation stage, such as before, during, and after learning is complete. The results obtained from these two studies after using video and media assistance Mobile Learning Service (MLS) showed that students' academic achievement in the intervention class received learning support blended learning better than in the control class.

Learning Reflection

The article that applied the blended learning method had effective results in learning activities so that students were able to reflect on the learning that had been given [19], [21], and [22]. It is explained that the researchers obtained significant results from the participants after acquiring communication skills among nursing students. This is inseparable from the support of communication implementation in the form of modules designed so that students' daily lives while in the lecture environment can run efficiently and critically in carrying out learning.

Learning Information Media

There is one article that explains that blended learning is effective in utilizing information media [12]and [23]. The instrument used in

this study was The Medication Knowledge Questionnaire (MKQ) to show a statistically significant increase over time in the score of medical knowledge among nursing students who received learning materials via SMS media. This may be motivated by support prior to the implementation of learning blended learning. These are in the form of learning device facilities, adequate infrastructure, planned learning content, and strategies for blended learning, which obtained good results in its implementation [30].

LIMITATION

This research has limitations, including limited access to databases and other costs that must be paid for.

IMPLICATIONS

Research implications systematic reviews: This is to provide fact-based scientific evidence for nursing students in the scope of lectures and policymakers who have limited time to find many quality research articles. Besides that, this research can be the basis for developing new motivational interventions that are more effective and efficient in managing learning blended learning so that quality and useful learning methods are obtained. In addition, in intervening blended learning, educators or researchers need to do screening in advance and consider reports related to the data obtained during the learning program. Method blended learning is used as the basis for developing evidence-based Base Practice Nursing for application in lectures and clinical settings.

CONCLUSION

Learning blended learning in nursing students is a learning model suitable to be applied to nursing learning competency standards because it has proven effective in the learning system. Based on the findings, the effectiveness of learning blended learning, which is focused on nursing students, certainly produces knowledge, clinical practice skills for nursing students, good content, and learning instructions, which becomes a reflection of learning and learning information media for every nursing student.

EXPRESSION OF INTEREST

The author states that there is no conflict of interest in carrying out the writing of this research.

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ETHICAL APPROVAL

It is a concern that of the fifteen articles in this review, only ten contained details of the ethical considerations undertaken by the researchers. With an increasing emphasis on ethical, innovative pedagogical practices in higher education, including the affordances of educational technologies to improve teaching and learning.

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