

Original Research

## Effectiveness of Blended Learning with Flipped Classroom Method on the Knowledge Level and Self Efficacy among Nurses During the Basic Life Support Course



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Article Info	Abstract
Article history: Received: 20 October 2022 Accepted: 29 November 2022	<i>Introduction:</i> The blended learning with flipped classrooms combination may propose a more effective and efficient way to share information in the course sessions. However, a scientific-based investigation is required to confirm its effect on knowledge and self-efficacy improvement during the BLS course learning sessions. <i>Methods:</i> This was a quasi-experimental study with a pre-post test design, enrolling nurses who were participating in BLS Courses. Participants were assigned into two groups: a control group with Blended learning (BL) or conventional learning approach (n=30) and an experimental group with Blended Learning with Flipped Classroom (BLFC) (n=30). A knowledge questionnaire from the American Heart Association (AHA) Guidelines and a Self-Efficacy questionnaire of Resuscitation Self-Efficacy Scale (RSES) were employed to gather the study data. Data were then analyzed using the SPSS with the mean, median, Wilcoxon, and Mann-Whitney tests. <i>Results:</i> Wilcoxon test revealed a significant mean difference in knowledge and self-efficacy in the BL group with a p-value of 0.000 and 0.000, respectively. Further, the Mann-Whitney test showed mean differences between groups, with p=0.084 in the knowledge and p=1.000 in the self-efficacy variable. <i>Conclusion:</i> Significant changes in knowledge and self-efficacy before and after the course sessions were observed in the BL and BLFC groups. However, findings yielded insignificant differences in the mean and median between groups.
Keywords: BLS course, blended learning, flipped classroom, knowledge, self-efficacy	

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## INTRODUCTION

Two years ago, since WHO's global pandemic declaration in December 2019 [1], Indonesia has been struggling to coexist with the COVID-19 pandemic. The pandemic hits the world hard and transforms all aspects of life. It delivers profound changes in the global educational field, transforming the educational processes and transfer of information. Physical distancing measures force the adoption of home-based learning. This sudden shift pushes immediate adjustment that extensively involves various technology tools and digital learning platforms [2]. The adoption of online learning continues to persist today, portraying the unceasing investment in online-based education, even during the post-pandemic era [3]. The utilization of digital information technology 4.0 is an actual example of a rapid and mobile technology revolution that cuts time, space, and place limitations [4].

The Indonesian government responded to the educational transformation during the pandemic by issuing remote and online learning policies/regulations. Students who lived in the green-zoned area were allowed to conduct face-to-face-based learning under strict health measures [5]. Previous studies yielded the effective influence of blended learning on educational processes [6], [7]. motivation, and study outcomes [8], [9]. Further, blended learning is perceived as a novel method of learning in the 2<sup>st</sup> century, in line with technology as primary source of information in this era [10].

Nursing is the nation's largest healthcare profession, with nearly 33.12% % from the

entire national healthcare professionals in 2014 [11]. This situation signifies that nurses have a higher chance of encountering cardiac arrest cases in the hospital or out-of-hospital settings. According to GWTG (Get With The Guidelines), 2018 in AHA (American Heart Associated), the occurrence of Adult IHCA (Intra Hospital Cardiac Arrest) Update 2020 was 10.16 (SD, 26.08) per 1,000 patient admissions in the hospital and 1.99 (SD 1.57) per 1000 hospitalization days with 54.2% ICU (Intensive Care Unit), operating room, or ER (Emergency Room) hospitalization and 45.8% in non-critical care area between 26,742 incidents in 319 hospitals in the United States of America and remains as the top emergency concern [12], [13].

Knowledge and self-efficacy are significant predictors during a cardio-pulmonary resuscitation (CPR) procedure in cardiac arrest cases. Partiprajak and Thongpo (2016), in their study, mentioned the association between the knowledge level of CPR with the standard of care and first aid effectiveness [14]. Higher levels of knowledge are correlated with better awareness, which plays a significant role in delivering proper CPR procedures. Knowledge also influences self-efficacy, encouraging the capacity to perform the procedures eventually [15]. Thus, adequate knowledge and self-efficacy propose high-quality CPR in cardiac arrest cases. Ornato and Peberdy (2005) highlighted the role of self-efficacy as a predictor in performing CPR procedures [16]. Maibach, Schieber, and Carroll (1996) stated that poor self-efficacy among health professionals highly contributed to the failure in delivering high-quality CPR, even among health

professionals with a high level of knowledge and skill [16]. Consequently, nurses' knowledge, skill, and self-efficacy influence sudden cardiac arrest survival and its success rate.

A typical concept applied in BLS courses, teacher-centered learning (TCL), is expected to be transformed into student-centered learning (SCL). Mentors are asked to encourage the students to actively participate in learning activities, not solely concentrate on the transfer of knowledge to the students [17]. Blended learning with a flipped classroom method is pictured as a learning method that transfers knowledge through digital media with unlimited access to the learning content. This method offers flexibility and convenience in learning. Students could learn before the class, access the information anywhere conveniently, or study conventionally. This method provides discussion sessions, engaging the mentors and students in the process of transfer of knowledge and skill [18]. However, flipped classroom learning method may not deliver an all-around effect on knowledge and skill level improvement, the situation and learning media also bring a crucial impact. The flipped classroom will offer the most promising outcome on knowledge and skill improvement if presented with the proper method, effective for the learning process and transfer of knowledge, efficient in terms of time, and involves sufficient space as referred by the ECC gold standard (Emergency Cardiovascular Course) [19], [20].

The poor level of BLS knowledge and skill among nursing students, it may occur due to ineffective transfer of knowledge process

during the course [21]. The combination of blended learning in the online and in-class study with a flipped classroom that focuses on the participant's need and involves attractive learning media (video simulation and electronic module) [22], [23] proposes an as effective method to improve knowledge and self-efficacy in performing BLS.

## **METHODS**

This was a quasi-experimental study with a control and experimental group. The control group (BL/Blended Learning) followed the conventional learning approach that mainly concentrated on the mentors. Contrary, the experimental group enrolled the BLFC (Blended Learning with Flipped Classroom) method that immensely incorporated participant engagement. The control and experimental group were then established as the first and second groups, respectively. A pre-post test design applied to investigate the level of knowledge and self-efficacy. We employed G-Power software to estimate the number of study participants. A total of 52 participants for both groups with an effect size of 0.8 were estimated. However, a total of 60 participants, 30 participants in each group, eventually decided to be enrolled in this study. Participants were picked through a convenience sampling technique. The level of knowledge data was gathered using a knowledge questionnaire. It has been validated using an AHA 2020 Guideline, involving a Pearson product-moment test with a value of  $r$ -count higher than the  $r$ -table (0.444) with an alpha reliability value of 0.739. The self-efficacy variable was

measured using the RSES (Resuscitation Self Efficacy Scale) Questionnaire established by Selly Desiani (2017), with the validation and reliability value of 0.84 and 0.91.

Study was conducted on February 2022 in a BTCLS course session from a health-based course program provider. A BL method was assigned to the control group, incorporating the Teacher-Centered Learning method for the online and in-class learning sessions. Zoom meeting application applied to convey the BLS information during online learning sessions, and a printed-learning module employed for the in-class learning sessions. The BLFC with a Student-Centered Learning method used an e-module and simulation video before the course sessions (asynchronous). An online discussion and question and answer session were subsequently conducted by the mentors (synchronous). In in-class sessions, participants were asked to demonstrate their ability to perform BLS using a training mannequin. Their skill was then evaluated by certified BLS mentors.

The study was conducted in line with the new normal-era situation and health measures established during the pandemic. The study ethical clearance has been granted by the Research Ethics Committee of the University of Muhammadiyah Jakarta No:035/PE/KE/FKK-UMJ/I/2022 and the University of Padjadjaran No:196/UN6.KEP/EC/2022 by considering

the aspect of Respect for Person, Confidentiality, Beneficence, and Justice.

## RESULTS

We enrolled 60 eligible participants in this study. The majority of them were women (61.7%), aged under 35 years, and graduated from vocational nursing school (55%). The majority of participants also confirmed previous participation in similar courses (61.7%). Further, 56% of them have claimed their experience in encountering patients with cardiac arrest.

There was a significant improvement in the pre and post-test scores in the control group (BL) ( $p=0.000$ ). A significant improvement was also reported in the experimental group (BLFC), with a  $p$ -value of 0.000. Further, a significant improvement in self-efficacy was also found in the control (BL) and experimental group (BLFC) with a  $p$ -value of 0.000 and 0.000, respectively. Wilcoxon test also revealed that data in both groups were not normally distributed.

Mann-Whitney Test confirmed a statistically insignificant knowledge level difference between the control (BL) and experimental (BLFC) group ( $p=0.084$ ). No substantial difference in self-efficacy was also discovered between the control (BL) and experimental (BLFC) group ( $p=1.000$ ). These findings eventually indicated no significant difference found between groups with  $p < 0.05$ .

**Table 1**

The Knowledge Level and Self-Efficacy Improvement among Nurses in Control (BL) and Experimental Group (BLFC) Before and After the Learning Session

Variable	Evaluation	Control BL (n=30) mean (median)	Experimental BLFC (n=30) mean (median)	Mann-Whitney Test
Knowledge	Pre-Test	56.00 (60.00)	56.00 (55.00)	p=0.084
	Post-Test	84.50 (85.00)	86.83 (85.00)	
	Mean Difference	28.50 (25.00)	30.83 (30.00)	
	Wilcoxon Test	p=0.000	p=0.000	
Self-Efficacy	Pre-Test	75.53 (75.00)	74.20(73.50)	p=1.000
	Post-Test	85.00 (85.00)	85.00 (85.00)	
	Mean Difference	9.47 (10.00)	10.8 (11.50)	
	Wilcoxon Test	p=0.000	p=0.000	

## DISCUSSION

The Basic Life Support (BLS) course in blended learning (BL) involved two learning styles. Initially, students were asked to participate in an online class to gain information about BLS. Subsequently, they requested to join the in-class sessions to demonstrate their ability in performing CPR procedures. Significant changes in the level of knowledge were discovered after the administration of the BL method in the course (p=0.000). This finding was parallel with a meta-analysis among nursing students in China that found a significant effect of blended learning on the level of knowledge p=0.00001 [25]. Knowledge was generally gained by our four senses: sight, taste, touch, and hearing, but mostly by our eyes and ears. Participants dominantly gained information from their eyes and ears from the BL methods. The idealism behind the concept of blended learning is a synergistic learning process,

incorporating the advantage of the online and in-class learning process. Students would be involved in online learning/training methods/mechanisms and face-to-face process learning to construct dynamic and interactive communication in the classroom [26].

We combined Blended Learning and Flipped Classrooms with Student Center Learning in the BLS Course. BLS courses generally conducted in traditional and non-traditional forms [20], [27]. During the rapid 4.0 technology development and revolution, digital-based courses are widely constructed to provide convenience for the participants and support conventional courses [28]. Blended learning has met the ECC gold standard course: the presence of mentors in improving knowledge, skill, and self-efficacy [29]. However, BL may offer several weaknesses: 1) lack of knowledge of the teaching resources "man" in using the digital-based technology, 2) the absence of means

"material" such as computers and internet access; 3) inadequate "method" of learning [30]. However, these shortages have been managed by establishing an initial requirement to participate in the study. Participants were mandated to follow a course about using smart devices in online learning sessions. In addition, the COVID-19 pandemic has forced everyone to own a smart device to adapt with the learning demands.

This finding was in line with a study conducted by Wulandari, A (2020). They found significant changes in CPR knowledge in the class with a Flipped Classroom method ( $p = 0.000$ ) [31]. Another study conducted among medical students also found similar findings. Flipped Classroom Approach was found to be associated with significant changes in knowledge scores, in comparison with the standard approach (77% compared to 65% in the knowledge test,  $p = 0.0001$ ) [32].

The BLS Course with BLFC has fulfilled the ECC standard requirement. Student-Centered Learning (SCL) was delivered in conventional and non-conventional forms [20], [27]. Flipped Classroom with SCL offers advantages in the education process and transfer of knowledge. By using this method, participants and mentors would have more time for discussion and evaluation sessions. Participants were asked to explore information independently through the content provided by the mentors, thus they could start the discussion and evaluation afterward. This method is also complemented with a simulation to apply the information shared before the face-to-face class. This concept was perceived as a sufficient idea to meet knowledge fulfillment, self-efficacy, and

skills [31]. However, digital media use remains a barrier for the mentors. Organizing attractive media seemed more challenging due to the unfamiliar digital media [33]. However, as the skill improved, the ability to master the technology would be developed.

Findings also suggested insignificant differences in the knowledge score improvement between the BL and BLFC groups. However, the mean difference in the BLFC group (30.83) was higher than the mean difference in the BL group (28.50). Interactive learning media use may increase students' motivation, which eventually delivered positive study outcomes [34]. Simulation videos and electronic modules add more advantages to interactive multimedia learning. Further, It could be stored in any smart device to be accessed anywhere and anytime.

A significant mean difference from the self-efficacy score in the BLFC group was documented. The self-efficacy mean difference in the BLFC group (10.8) was higher than the mean difference in the BL group (9.47). The use of simulation videos may evoke the sense of sight and hearing during the learning process in gaining information about BLS depicted by the video. The use of simulation video adds another benefit, not only able to enhance skill in performing CPR but also encouraging creative thinking among the students [35]. The level of self-efficacy and knowledge retention may significantly differ after a long period of time. Digital media and platforms are presented as an alternative to prevent low self-efficacy and knowledge retention by providing portable spaces of information that could be accessed

anywhere and anytime [32]. All this situation has made technology and digital platforms propose effective and efficient tools for a better future of education in the current digital era.

No statistically significant difference between the two learning processes was discovered in the study. However, it was revealed that the BLFC method presented a more effective impact in increasing knowledge and self-efficacy in comparison to the BL method. It may occur because of the insignificant difference between the intrinsic and extrinsic motivation that drove the students to study in both groups. This finding was similar to a study conducted among psychology students who used digital learning tools in Surabaya in 2014-2015 with Sig.  $0.946 > 0.05$  [34].

## CONCLUSION

BLFC provided advantageous effects in fulfilling the mentors' and students' need to gain a certain level of knowledge and self-efficacy more effectively and efficiently. Despite the insignificant statistical findings, the higher mean and median difference in the BLFC group may demonstrate a more effective and efficient alternative strategy for a BLS course among the nurses to improve the knowledge level and self-efficacy that eventually influenced their skill in performing BLS. BLFC application in nurse's courses incorporated the traditional and non-traditional approaches concentrated on the participants by implementing the preferred learning media. Additionally, a varied type of media, such as simulation applications, game-

based learning, etc. are required to be developed to foster the nurse's skill improvement.

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