

THE EFFECTIVENESS OF PROJECT-BASED BLENDED LEARNING MODEL ASSISTED WITH INTERACTIVE MULTIMEDIA ON STUDENTS' LEARNING OUTCOMES

A EFICÁCIA DO MODELO DE APRENDIZAGEM MISTURA BASEADO EM PROJETOS ASSISTIDO COM MULTIMÍDIA INTERATIVA NOS RESULTADOS DE APRENDIZAGEM DOS ALUNOS

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Abstract: This study aimed to investigate the effectiveness of a project-based blended learning model assisted with interactive multimedia on students' learning outcomes. It was designed in a quantitative study using the Wilcoxon test. It also involved 100 students of the Physical Education, Health, and Recreation Department at Universitas Pendidikan Ganesha selected by using a random sampling technique. A test was conducted to obtain the data. The result of the study shows that the project-based blended learning model assisted with interactive multimedia effectively affects students' learning outcomes in *Pencak Silat* courses. It has a moderate effect on students' learning outcomes. Lecturers in teaching *Pencak Silat* course can use the innovative learning model assisted with interactive multimedia. They are suggested to implement it attentively to get better results in the future.

Keywords: Interactive multimedia. Learning outcomes. Project-based blended learning.

Resumo: Este estudo teve como objetivo investigar a eficácia de um modelo de aprendizagem combinada baseado em projetos e assistido com multimídia interativa nos resultados de aprendizagem dos alunos. Foi desenhado em um estudo quantitativo utilizando o teste de Wilcoxon. Também envolveu 100 alunos do Departamento de Educação Física, Saúde e Recreação da Universitas Pendidikan Ganesha, selecionados por meio de uma técnica de amostragem aleatória. Foi realizado um teste para

obtenção dos dados. O resultado do estudo mostra que o modelo de aprendizagem combinada baseado em projetos, assistido por multimídia interativa, afeta efetivamente os resultados de aprendizagem dos alunos nos cursos *Pencak Silat*. Tem um efeito moderado nos resultados de aprendizagem dos alunos. Os professores do curso *Pencak Silat* podem usar o modelo de aprendizagem inovador auxiliado por multimídia interativa. Sugere-se que o implementem com atenção para obter melhores resultados no futuro.

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Palavras-chave: Multimídia interativa. Resultados de aprendizagem. Aprendizagem combinada baseada em projetos.

1. Introduction

The use of a learning model supports a teaching and learning process. A learning model can be defined as a plan to guide the learning process (Irviana, 2020). Some steps are designed during the learning process. In addition, Syatriana and Sakkir (2020) state that the learning model covers systematic activities. These activities are experienced from simple to complex activities. Moreover, Ariyana et al. (2020) argue that the learning model organizes the content of lessons. Therefore, it can be said that the learning model covers organized and systematic learning activities used by teacher to manage the learning process.

One of the 21st century learning models is project-based learning. Project-based learning covers a meaningful project as the core activity to create an authentic product (Guo et al., 2020). Students get real experiences in making a product from their learning. In addition, project-based learning provides beneficial experiences for the students (Afriana et al., 2016). They have a chance to construct their concept and apply it to a product. They can connect their prior knowledge to the learning process. Moreover, the result of the product during their learning process can be used to solve the problems faced by students as well as to know students' development (Habók & Nagy, 2016). The product is the reflection of students' learning process. They develop the product to handle problems and see how their performance during the learning process. It can be seen that project-based learning emphasizes a project during the teaching and learning process to give authentic experiences.

The implementation of project-based learning can be integrated with blended learning since nowadays can be conducted face-to-face and from home. Ughanda and Badre (2020) state that blended learning is a combination of some learning methods in delivering learning materials. It indicates that several learning methods are used during the learning process to create different activities for their learning. Besides, Simbolon (2021) and Islam et al. (2022) state that blended learning facilitates online and offline learning. It provides flexible learning which can be conducted virtually with the assistance of connection and direct learning in the classroom. Thus, blended learning provides a different learning atmosphere both online and offline learning.

The integration of project-based learning and blended learning known as project-based blended learning is suitable for the current learning situation. This innovative learning model can give beneficial experiences since advantages of both learning concepts are delivered in the learning

process. The innovative learning model provides different learning atmosphere for students in which they can increase their critical thinking (Farida et al., 2017; Watrighthos, 2019). It is because they can access information from any sources both online and offline. It is supported by Nijakowski et al. (2021) in which the needed materials from different source for students can engage more on the topic being discussed. It makes students explore the topic and get deep discussion during teaching and learning process. In addition, this innovative model supports students to collaborate with other students since they have a project to be accomplished (Ummah et al., 2019). In short, project-based blended learning provides an innovative learning atmosphere for students.

However, there was a problem regarding students' learning outcomes especially on *Pencak Silat* course. *Pencak Silat* is a course dealing with a martial art in from Indonesia. Johor (2019) found out that students' learning outcomes on *Pencak Silat* were low. It indicates that student learning outcomes are still below standard which make them failed or not passing the *Pencak Silat* course. In line with this matter, Spyanawati (2015) reported that low learning outcomes due to provision of conventional model in the learning process. Educators did not use proper media for the learning process. Due to this condition, it leads to students' boredom. It is supported by Wirawan and Gading (2022) in which lack of learning media leads to boredom since teachers cannot explain the learning contents. Besides, studies done by Aisyah and Haryudin (2020) and Rachmadi et al. (2023) show that the use of textbooks are too monotonous for students. This learning condition leads boredom since they only focus on the provision of textbooks. Another study revealed by Ningsih and Sari (2021) showed that online learning situation also can make students feel bored because of students' failures in handling problems like poor connection. These previous studies show that there are still problems both online and offline learning concerning students' boredom.

The problem regarding students' boredom needs to be solved since it can affect students' learning outcomes. It can be handled by the assistance of interactive multimedia. Interactive multimedia can be defined as media which can run the learning process smoothly (Khoiriyah, 2017). In addition, interactive multimedia is a utilization of computer containing a set of material in the form of videos, images, or audios (Komalasari & Rahmat, 2019; Primamukti & Farozin, 2018). Besides, interactive multimedia is media which can be easily controlled and operated by users (Lindasari et al., 2019). It indicates that teachers can use it in managing their class. Thus, it can be said that interactive multimedia provides interesting features as learning media.

The advantages of interactive multimedia have been reported by some previous researchers. Maulidah et al. (2018) revealed that interactive multimedia is effective to be implemented in the learning process since it facilitates students in understanding information from their reading. Next, Primamukti and Farozin (2018) revealed that interactive multimedia is effective on students' learning outcomes and learning interest. It indicates that students want to learn attentively due to the provision of interactive multimedia. Furthermore, Maria et al. (2019) reported that students can memorize the learning content due to the provision of interactive multimedia. Moreover, Muflihatin and Sukarmin (2022) reported that the provision of interactive multimedia can avoid students from misconceptions. In short, the provision of interactive multimedia enhances students' learning outcomes.

Regarding the benefits of the innovative learning model in the 21st century learning and impact of interactive multimedia to handle learning problems due to students' boredom, the implementation of project-based blended learning assisted with interactive multimedia is needed in the learning process. Therefore, the present study aims at finding out the effectiveness of project-based blended learning assisted with interactive multimedia on students' learning outcomes in *Pencak Silat* course.

2. Research design and methods

The present study was designed in quantitative study. It aimed at examining the effectiveness of project-based blended learning assisted with interactive multimedia. It involved 100 students of Physical Education, Health, and Recreation department at Universitas Pendidikan Ganesha. They were selected by using random sampling technique. The data were obtained from a test. Pretest and posttest were conducted in this study. Pretest was obtained before implementing project-based blended learning assisted with interactive multimedia, whereas posttest was obtained after implementing project-based blended learning assisted with interactive multimedia. Then, the obtained data were analyzed statistically using Wilcoxon test. Finally, the data were presented into tables along with their descriptions.

3. Results

After obtaining the needed data, normality test was conducted to check its normality. The result of normality test was presented in Table 1 as follows.

Table 1. Test of Normality

Tests of Normality						
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	.146	100	.000	.939	100	.000
Posttest	.130	100	.000	.952	100	.001

a. Lilliefors Significance Correction

Table 1 shows the result of normality test. It involved pretest and posttest. The samples of the study were 100 students. Table 1 shows the result of normality viewed in Kolmogorov-Smirnov was 0.000 for both pretest and posttest. It showed that the value was less than 0.050. It indicated that the data were not distributed normally.

After getting the result of the normality, non-parametric analysis was conducted since the data were distributed normally. It applied Wilcoxon test to measure differences between two paired groups. The result of the test was presented in Table 2 and 3 as follows.

Table 2. Ranks Value

Ranks				
		N	Mean Rank	Sum of Ranks
Posttest- Pretest	Negative Ranks	2 ^a	8.00	16.00
	Positive Ranks	98 ^b	51.37	5034.00
	Ties	0 ^c		
	Total	100		

a. Posttest < Pretest
b. Posttest > Pretest
c. Posttest = Pretest

Table 2 shows that the value of ranks. It showed that negative ranks were 2 (N), 8.00 (mean rank), and sum of ranks (16.00). It indicated 2 students from 100 students got reduction of score about 8.00 with total score of 16.00 from their pretest and posttest. On the other side, it also showed that positive ranks were 98 (N), 51.37 (mean rank), and sum of ranks (5034.00). It indicated 98 students from 100 students got enhancement of score about 51.37 with total score of 5034.00 from their pretest and posttest. Then, value of Ties was 0 indicating there were no the same value between pretest and posttest.

Table 3. Test Statistics

Test Statistics ^a	
	post - Pre
Z	-8.670 ^b

Asymp. Sig. (2-tailed) .000

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

Table 3 shows that the value of Asymp. Sig. (2-tailed) was 0.000. It was lower than 0.050 indicating there was significant difference for students' learning outcomes between pretest and posttest. It can be concluded that there is an effect of project-based blended learning assisted with interactive multimedia on students' learning outcomes in *Pencak Silat* course.

In order to know the level of effectiveness, the result of N-Gain Score was identified as presented in Table 4 as follows.

Table 4. N-Gain Score

N	Pretest	Posttest	N-Gain Score
100	74.92	87.9	0.51

Table 4 shows the results of N-Gain score. It showed that the mean score of pretest was 74.92 and posttest was 87.90. Besides, the value of N-Gain score was 0.51. The score of N-Gain was in the range $0.3 \leq 0.51 \leq 0.70$ indicating that the effect was in moderate level. It can be said that the implementation of project-based blended learning assisted with interactive multimedia give moderate effect on students' learning outcomes in *Pencak Silat* course.

4. Discussion

The result of the present study shows that project-based blended learning assisted with interactive media has moderate effect on students' learning outcomes in *Pencak Silat* course. It shows that the innovative learning model can improve students' learning outcomes. The effect of the model is due to the nature of project based learning and blended learning. As stated by Guo et al. (2020), project-based learning covers a meaningful project during the learning process. This project leads students to experience in finishing a product creation. As supported by Afriana et al. (2016), project-based learning presents a beneficial experience for the students. This learning model allow students to construct their concept and apply it to a product. In this case, students' prior knowledge about *Pencak Silat* can be implemented in doing a project. It strengthens the knowledge of the students since they practice it. Moreover, Habók and Nagy (2016) state that project-based learning can be used to know the students' development. In this case, during making the project, students know what to do when they face challenge as well as find the solution of problems. Next, Ummah et al. (2019) state that project-based learning promotes collaboration. It indicates that students can work together with their friends in learning *Pencak Silat*. It allows

students to find more information and discuss it together. Overall, the nature of project-based learning leads students to practice their knowledge so they can strengthen their understanding due to provision of project.

Apart from project-based learning, the nature of blended learning also contributes to students' engagement. As stated by Ughanda and Badre (2020) state that blended learning provides some learning methods in delivering learning materials. In this case, students can experience different learning activities in learning *Pencak Silat*. They can explore their prior knowledge about *Pencak Silat*. Besides, Simbolon (2021) and Islam et al. (2022) argue that blended learning facilitates online and offline learning. In line with this statement, the nature of blended learning gives more time for students in learning *Pencak Silat*. They can learn face to face in the classroom as well as they can also learn at home by accessing the learning content assisted with internet connection. It gives chance for students to get information about *Pencak Silat* in the classroom and review its material at home. Therefore, blended learning provides more chances for students to spend their time for learning.

In addition, the assistance of interactive multimedia maximizes the learning process. Komalasari and Rahmat (2019) and Primamukti and Farozin (2018) state that interactive multimedia covers a set of material containing videos, images, or audios. In this case, the provision of interactive multimedia presents an interesting display of materials about *Pencak Silat*. This interesting media attract students' attention to learn more about *Pencak Silat* since they do not feel bored during the learning process. They have a willingness to explore more about materials framed in the interactive multimedia. Furthermore, Lindasari et al. (2019) state that interactive multimedia are useful to be used in managing the learning process. It indicates that the display of learning materials about *Pencak Silat* is presented systematically. Students easily understand the contents inserted in the interactive multimedia. In conclusion, the use of interactive multimedia minimizes students' boredom which lead them to be attentive in joining the learning process.

Regarding the explanation above, it shows a prove that project-based blended learning assisted with interactive multimedia gives effect on students' learning outcomes in *Pencak Silat* course. It is because the innovative model can practice students' knowledge, spend more time for learning, and minimizes students' boredom. This present study emphasizes the innovative learning model with assistance of interactive media. Comparing to previous studies, the present study is different from a study conducted by Nurhalizah et al. (2023) since the previous study concern on the of ladder drill training on the results of female straight front kick. On the other side, Effandy and Ihsan (2020) conducted a study to develop kick speed instrument in *Pencak Silat*. Besides,

Effendi and Welis (2022) discuss the treatment of soy flour and lunges training on the ability of the front kick speed of *Pencak Silat* athletes. Meanwhile, Sudirman (2022) emphasized on the provision of downhill training on the speed of *Pencak Silat* sickle kicks. In spite of the difference, a study Handayani et al. (2021) found a similar result in which project-based learning is suitable for learning *Pencak Silat*. It shows that project-based learning is useful to be used in learning *Pencak Silat*. The explanation above concludes that the present study presents an innovative and different discussion compared to the previous studies which make it diverse as well as needed to be explored.

5. Conclusion

The presents study concludes that project-based blended learning assisted with interactive multimedia has effect on students' learning outcomes in *Pencak Silat* course. This innovative learning media provides a different and authentic atmosphere in the learning process. The results of the study implicate to educational field in which this innovative learning model assisted with interactive multimedia can be used by lecturers in teaching *Pencak Silat*. Due to moderate level of effect obtained from the learning model, the lecturers are suggested to pay attention to details in the steps of implementing the learning model to get maximum results. The present study reveals that the learning model has moderate effect which can be better or higher if the lecturers can give details on all activities or steps followed by the students.

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