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Moving from Traditional Teaching to Blended Learning in the Teaching and Learning of Sports Test and Measurement Course to Improve Students' Learning Outcomes

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ABSTRACT

Blended learning is an innovation that gives a new colour to the teaching and learning process of physical education. It is one of the instructional models integrating traditional learning systems with online learning. The present research aims to test the effectiveness of blended learning as an alternative to traditional teaching to improve students' learning outcomes in the course of sports test and measurement. It employed an experimental method with the pre-test and post-test control design. The participants were students of the Physical Education Department at University of Suryakancana, Cianjur. A multiple-choice test was used to measure the students' learning outcomes in the course. The results show that there was a difference in the improved learning outcomes in the course of sports test and measurement between students taught with traditional learning and those with blended learning. It can be concluded that blended learning was more effective than traditional learning.

Keywords: Blended learning, Sport tes, Student's learning outcomes

INTRODUCTION

The phenomenon of industry 4.0 has a significant impact on education, including physical education. Education 4.0 is a response to the need for the fourth industrial revolution where humans and machines are aligned in an attempt of seeking for a solution to problems and find possible innovations in education (Series.C, 2019). This phenomenon translates as a challenge and simultaneously a demand for all lecturers in higher education to give quality education for their students. The teaching and learning of physical education, especially in the course of sports test and measurement currently adopts the traditional or face-to-face approach with unsatisfactory learning outcomes. Therefore, a learning model that is suited to the development of education 4.0 is needed, which is the blended learning (BL) (Waha, B & Davis, K, 2014)

Blended learning (BL) is defined as a learning model that integrates traditional or face-to-face learning model with online learning, where students and lecturers interact with and without technology (Waha, B & Davis, K, 2014). BL is alternatively defined as a model that integrates or combines various programs, such as classroom learning activities, but with student assignments that are accessible through the internet (Kastrup, et al, 2018). The teaching model combines new technology with the traditional, face-to-face method, which is desirable for many lecturers and students.

Some of the examples of technological aids used include podcasts, lecture capture, online chat, discussion boards, and google classroom. These tools are the features frequently used in instructional management (Lyons, T & Evans, M., 2013). BL has become increasingly popular, as shown by how the model is widely practiced by academics around the globe (Alebaikan, R & Troudi, S., 2017), in various fields such as education, military, medicine, nursing, business, and engineering.

The American Society for Training and Development stated that BL is one of the top ten trends in the knowledge industry today (Halverson, L. R., et al. 2012) and is regarded by some experts as the best education practice (Taylor, P. Et al). A survey by Sloan Consortium showed that 55% of the institutions

(e.g., universities) in the United States applied BL (Allen, I. E.) The scheme of BL is presented in Figure 1

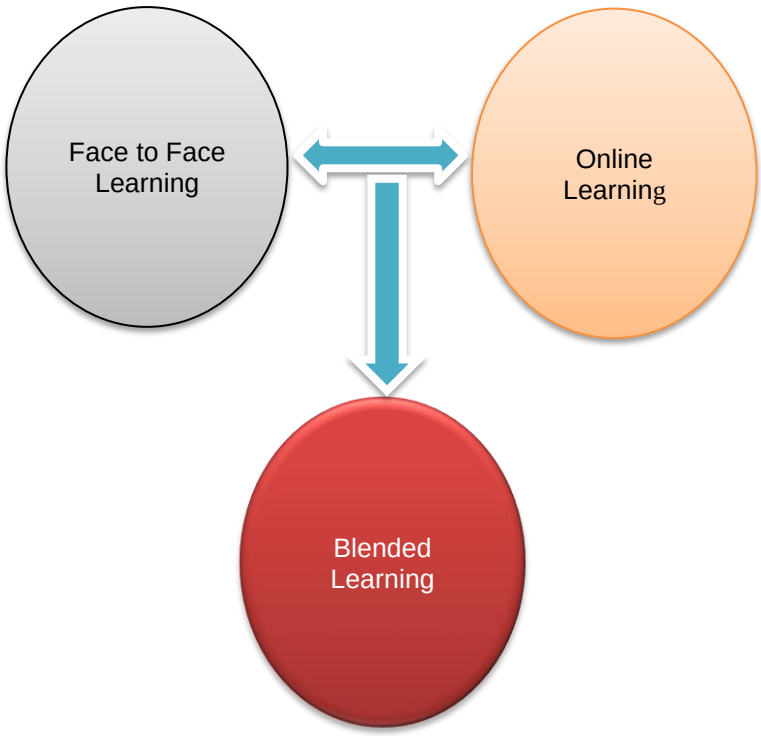

Figure 1. Blended Learning Scheme

BL is a highly flexible learning model (Pavla, et al, 2015), as it does not depend on time and space for learning and is accessible anytime, anywhere. The activities commonly included in BL include asking, answering, or interacting between students and lecturer and between students. BL is a mix of face-to-face and online interactions that enable collaborative and interactive learning, which is increasingly used as a strategic curriculum (Cooner, 2016). Through BL, students will be actively involved in the teaching and learning process, thereby helping them develop their skills of self-reflection, self-direction, and self-management (George & Keeffe, 2010). In addition, BL has the potential to lead students towards developing their learning autonomy and responsibility as well as metacognitive processes.

BL implementation can facilitate communicative learning environment, creating meaningful learning outcomes (Okaz, 2015). However, teachers' lack of a proper understanding of BL will inhibit the attainment of expected learning outcomes (Taylor, et al). Much research has been done on the effectiveness of BL at the level of individual courses, but there has been a dearth in research that can provide guidelines at the level of institutions (Graham, et al, 2013). Furthermore, no research was found on the implementation of BL in comparison to traditional teaching (TT) in the context of physical education instruction. Therefore, the present research aims to test the effectiveness of BL as an alternative to TT to improve students' learning outcomes in the course of sports test and measurement.

RESEARCH METHOD

The research adopted a quasi-experimental method with the pre-test and post-test control design. Two classes were involved in the research, namely the experimental class (E) and the control class (C). The research was carried out for one semester (16 sessions), from September to December 2019.

The research was granted a permission from University of Suryakancana and conformed to the Code of Ethics of World Medical Association (Helsinki Declaration). The research participants were third year students of the Department of Physical Education, Health, and Recreation (PJKR) of University of Suryakanca Cianjur (N=40, PJKR III-A= 20, PJKR III-B= 20) with the following demographic characteristics: age = 21.4±1.2 years, height = 167.9±4.6 cm, weight =56.7±9.3 kg.

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All participants were divided equally into the experimental class (20) who would receive BL intervention, and the control class (20) who would be taught with TT. In the first meeting, all students from both classes were given a pre-test in the form of a multiple-choice test. From the second to the 14th meeting, BL and TT interventions were given, and in the 16th meeting, the E and C classes were given a multiple-choice post-test. The learning program is described in detail in Table 1.

Table 1: Learning Program

Meeting	BL	TT
1	Pre-Test (Multiple Choice)	
2	Concepts of Test, Measurement, and Evaluation	Concepts of Test, Measurement, and Evaluation
3	Selecting Good Test Criteria	Selecting Good Test Criteria
4	Tests in the Cognitive, Affective, and Psychomotor Domains	Tests in the Cognitive, Affective, and Psychomotor Domains
5	Motor Ability	Motor Ability
6	Motor Educability	Motor Edn ucability
7	Test and Measurement of Physical Strengths, Resilience, Speed, Power	Test and Measurement of Physical Strengths, Resilience, Speed, Power
8	Test and Measurement of Flexibility, Agility, Coordination, Balance, Reaction	Test and Measurement of Flexibility, Agility, Coordination, Balance, Reaction
9	Test and Measurement of Physical Fitness	Test and Measurement of Physical Fitness
10	Test and Measurement of the Sport Branches of Soccer, Volleyball, Basket Ball	Test and Measurement of the Sport Branches of Soccer, Volleyball, Basket Ball
11	Test and Measurement of the Sport Branches of Handball, Badminton	Test and Measurement of the Sport Branches of Handball, Badminton
12	Test and Measurement of the Sport Branches of Hockey, Table Tennis	Test and Measurement of the Sport Branches of Hockey, Table Tennis
13	Test and Measurement of the Sport Branch of Tennis	Test and Measurement of the Sport Branch of Tennis
14	PAN and PAP	PAN and PAP
15	How to Process Data of Test and Measurement Results	How to Process Data of Test and Measurement Results
16	Post-Test (Multiple Choice)	

The multiple-choice test consisted of 30 questions. This instrument had a score of validity and reliability of 0.80 and 0.90, respectively. The data were analysed using IBM (version 25) to look for descriptive physical characteristics of the participants (age, height and weight), followed by normality and homogeneity tests using the Shapiro-Wilk and Levene tests. The difference in the learning outcomes of the sports test and measurement course between the class with BL and TT interventions was tested with independent sample *t*-test, with a criterion of significance level of $p \leq 0.05$ [16].

RESULTS AND DISCUSSION

The description of participants' demographic characteristics (age, height, and weight) is presented in Table II, and the results of descriptive statistics are displayed in Table III. The results of normality test using Shapiro-Wilk confirmed that data were normally distributed, and Levene test revealed that the data were homogeneous. The results of the difference in the learning outcomes for the course of sports test and measurement between the classes taught with BL and TT are provided in Table IV.

Table 2: Participants' Characteristics

Characteristic	N	M		SD
Age (y)	40	21.4	±	1.2
Height (cm)	40	167.9	±	4.6
Weight (kg)	40	56.7	±	9.3

Table 3: Statistical Data

Group Statistics					
Activity	Class	N	M	±	SD
Pre-Test	BL	20	10.90	±	1.553
	TT	20	10.45	±	1.572
Post-Test	BL	20	25.10	±	3.144
	TT	20	20.50	±	1.395

Table 4: Independent Samples *t*-test

	t-test for Equal Means					
Dependent Variable	F	*t*	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Learning outcomes	9.715	5.981	38	.000	4.600	.769

Table IV shows that there was a difference in the learning outcomes for the course of sports test and measurement between the classes intervened with BL and TT (F= 9.715, p≤ 0.05). Based on the experimental class' pre-test score (M=10.90±SD=1.553) and post-test score (M=25.10±SD=3.144) compared to the control class' pre-test score (M=10.45±SD=1.572) and post-test score (M=20.50±SD=1.395), it can be seen that the class taught with BL had a more significant improvement in their learning outcomes than the TT-taught class (see Table III).

This research embarked on the aim of testing the effectiveness of BL as an alternative to TT to improve the learning outcomes of students in the course of sports test and measurement. The research indicated with accuracy that BL had more significant impact in optimising students' learning outcomes compared to TT (Series & Science, 2018). The intervention with BL encouraged students to be more enthusiastic in the teaching and learning of sports test and measurement course, thereby increasing their knowledge significantly (Coll, et al, 2017). Another study found that BL significantly increased students' involvement in the teaching and learning process (series, 2019), led to strong motivation (Islam. Et al, 2018), and even could make students more independent in completing all assignments given by the lecturer (Dalsgraad, et al, 2008). BL could open up students' mind, helping them to see a situation from multiple perspectives; help them manage their learning time more effectively and efficiently; and improve their teamwork, promote their self-reflection, and improve their reasoning skills (Monteiro, et al).

BL has become an alternative to the outdated traditional teaching that should be abandoned altogether. BL has more positive values than other learning models such as a flexible learning that can be done anywhere and anytime without the constant monitoring of the lecturer. BL has been shown to be more effective than TT (Bernard, et al, 2014). The results of this research are consistent with those of a meta-analysis done by the US Department of Education which demonstrated that BL led to stronger learning outcomes than TT (Means, et al, 2009). BL consistently gave a significant impact on all education sectors. Adopting BL is an effective strategy to face the changes brought about by industry 4.0 towards more quality physical education.

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CONCLUSIONS

The results of this research have contributed a new insight to the limited amount of research on BL in the context of physical education. BL is an important teaching method that should be used in education in general, particularly for physical education in the future. We suggest that all lecturers apply BL in all courses of physical education that are still taught with traditional teaching because this research has proven that BL had a positive impact on improved learning outcomes of students in the course of sports test and measurement, and the students admitted that BL was better than TT (Keogh, et al, 2017). The limitation of this research lies in the small number of research participants and the limited wifi network that did not reach all areas on campus. Future research should be done on how to improve the learning outcomes in other physical education courses.

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