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Development of blended learning based learning module: Benefits to physical education learning outcomes

Rozwój modułu nauczania opartego na blended learning: Korzyści dla wyników nauczania wychowania fizycznego

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Abstract

This research will first produce a product in the form of a learning module based on blended learning and its benefits to Physical Education (PE) learning outcomes. This research is a research and development model used is ADDIE. Subjects of expert validation using expert lecturers of PE learning with minimum qualifications of Doctoral degrees totaling 7 people. Subjects to determine the effectiveness of the product are 6 elementary schools that are determined by random sampling. Subjects totaled 79 students, of which 41 experimental class students and 38 control class students. The feasibility level of the PE learning module based on blended learning from the evaluation data of experts. Effectiveness testing using t test independent samples test. The results showed that the blended learning-based learning module developed was feasible and effective in improving PE learning outcomes. The module is web-based, utilizes text, audio, video, and multimedia and can be done during self-study. The development of blended learning-based learning modules is a means and motivation for learning in facilitating the learning process in improving student learning outcomes. Other researchers can conduct further research using blended learning-based learning modules covering more aspects and applying them to different learning materials.

Keywords

learning module, blended learning, learning results, physical education

Streszczenie

Niniejsze badanie ma na celu opracowanie produktu w postaci modułu nauczania opartego na blended learning (naucze mieszanej) oraz zbadanie jego korzyści dla wyników nauczania z wychowania fizycznego (WF). Badanie to jest realizowane w modelu badań i rozwoju, przy użyciu metodyki ADDIE. Do walidacji eksperckiej wykorzystano wykładowców specjalizujących się w nauczaniu WF, posiadających co najmniej stopień doktora, w liczbie 7 osób. Do oceny efektywności produktu wybrano losowo 6 szkół podstawowych. Badanie objęło łącznie 79 uczniów, z czego 41 uczestniczyło w klasie eksperymentalnej, a 38 w klasie kontrolnej. Ocena przydatności modułu nauczania WF opartego na blended learning została przeprowadzona na podstawie danych z ewaluacji ekspertów. Efektywność testowano za pomocą testu t dla niezależnych próbek. Wyniki wykazały, że opracowany moduł nauczania na bazie blended learning jest użyteczny i efektywny w poprawie wyników nauczania WF. Moduł jest oparty na stronie internetowej, wykorzystuje tekst, audio, wideo i multimedia i może być stosowany podczas samodzielnej nauki. Rozwój modułów nauczania opartych na blended learning stanowi środek i motywację do nauczania, ułatwiając proces nauki i poprawiając wyniki uczniów. Inni badacze mogą prowadzić dalsze badania, wykorzystując moduły nauczania oparte na blended learning, obejmujące więcej aspektów i stosując je do różnych materiałów dydaktycznych.

Słowa kluczowe

moduł nauczania, blended learning, wyniki nauczania, wychowanie fizyczne

Introduction

Education is part of the thought process that takes place from the experience of one generation to the next, and plays an important role in the progress of a nation and state. Education has undergone a very dynamic development over the last twenty years, hence various important modifications have been made to various aspects of the education system, one of which is Physical Education. Physical Education today emphasizes the importance of exercise for physical and mental well-being [1, 2]. The study of Physical Education is also essential for physical fitness, and physical fitness is a human need. The focus of modern Physical Education is on educating pupils on how to assess their own fitness and the importance of fitness on their future. The selection of inappropriate methods in Physical Education learning will lead to boredom and decreased student interest in learning. This is due to the lack of understanding and the level of student participation in learning activities.

The standards for 21st century or digital century schools for teachers and students relate to the application of technology in learning. Alternative 21st century learning methods that are appropriate to use today, one of which is the blended learning method. In addition, the use of other information technology also contributes to preparing 21st century learning, for example: the use of Massive Open Online Courses (MOOCs), video game-based learning, the use of e-learning either using Learning Management System or other learning applications, and the use of mobile learning as learning media.

The current situation of environmental conditions is different from before, learning must continue. A teacher must remain professional in carrying out the task of teaching and of course must be ready to face challenges. The task of a teacher becomes very complex in planning learning so that students in learning remain comfortable and understand the material provided. Teachers are required to be able to teach students in accordance with what has been programmed, so that it is truly directed in accordance with the expected goals. Taking into account the obstacles and limitations observed by the author through observations made, a learning companion module is needed for learning. Learning modules are teaching materials that are organized and structured to achieve the objectives and skills to be achieved. Modules are made using language that is easily understood by students according to the level of understanding of students according to their level. A module must show the basic competencies that must be achieved by students, and be displayed in good language, interesting, and complete with examples of images that help the material to be mastered by students. Module is one of the development of teaching materials.

The development of e-learning and the lack of effectiveness of learning led to the development of a combined learning model which can be called a blended learning model [3]. Blended learning combines synchronous and asynchronous learning in equal proportions. Such a model is not new and has been widely implemented, for teachers who have not yet implemented it, many trainings on the application of blended learning are provided [4]. Blended learning is not just a slice but a combination of face-to-face and online learning [5]. Blended learning is not only a combination of face-to-face and online learning, but also the incorporation of all learning modalities and styles, as well as the incorporation of instructional methods [6]. Blended learning

is also a combination of synchronous and asynchronous learning which can be either online or offline or both [8, 9].

The purpose of blended learning is to make learners more active and independent in learning [10, 11]. The advantages of the blended learning model are that it can be used to deliver learning materials anywhere and anytime, learning occurs online and offline which complement each other, learning becomes effective and efficient, increases accessibility, and learning becomes flexible and not rigid [11]. Several studies show that blended learning significantly improves learners' skills and learning achievement [13–15], and increase students' learning motivation [16–18].

It is not enough for teachers to have basic technology skills, such as using a computer and connecting to the internet, but also the knowledge to use recording devices and software, as well as methods to deliver lessons without face-to-face interaction (engaging learning videos). These skills will be required when using online learning platforms. More importantly, the gap between learning scenarios and on-the-ground execution needs to be minimized. The blended learning process should still be able to accommodate students' learning needs to develop their talents and interests according to their education level. However, to realize this, it requires the readiness of educators, the appropriate curriculum, the availability of learning resources, and the support of devices and stable networks, so that communication between learners and educators can be effective.

This module will be made so that it can be used especially for teachers and elementary school students, whose purpose is to assist students in learning and make it easier to understand learning. Based on this, the author took the initiative to make a research entitled "Development of Blended Learning-Based Learning Modules: Its Benefits to Physical Education Learning Outcomes". The resulting product can be used as encouragement and motivation for teachers to create new breakthroughs and variations in providing material by utilizing media, so that students do not feel bored quickly and students are easier to understand the material.

Materials and methods

The expert validation was conducted by seven lecturers specialized in Physical Education, each holding at least a Doctoral degree. The study's participants were teachers and elementary school students in the Special Region of Yogyakarta. The study involved six elementary schools selected through random sampling. In total, 79 students participated in the study, comprising 41 in the experimental group and 38 in the control group.

This study employs a research and development approach. The research and development process involves several stages, based on the theories of multiple experts. The development model, based on Lee & Owens' theory, incorporates five phases: Analysis, Design, Development, Implementation, and Evaluation (ADDIE). This model was chosen for its systematic approach and theoretical basis in learning design [18]. The ADDIE model's simplicity and systematic nature make product development more straight forward. Once the product is completed and deemed feasible, its effectiveness is then evaluated. The research design used is the 'Pretest-Posttest Only Control Group Design'.

Seeing the feasibility level of the Physical Education learning module based on blended learning from the evaluation data of experts, a rating scale measurement scale is used. With a rating scale, the raw data obtained in the form of numbers is then inter-

preted in a qualitative sense. Furthermore, the results of the above calculations are interpreted using an interpretation scale. Effectiveness testing used independent samples t test. The statistical analysis technique used Statistical Package for Social Science (SPSS) software version 21.

Results

Expert validation results

In the development stage, the framework produced at the design stage and still procedural is realized in order to become a pro-

duct that is ready to be implemented. The product in the form of a blended learning-based Physical Education learning module is assessed by experts to get value and input. After validation by experts there are various suggestions for improvement. Suggestions for improvement from experts become a reference for researchers to make improvements to the products developed. The assessment conducted by material experts and media experts uses a Likert scale (score 1-4). The results of the material expert assessment of the blended learning-based Physical Education learning module are presented in Table 1.

Table 1. Data of material expert assessment results

Aspect	Percentage (%)	Category
Content Eligibility	87.38	Feasible
Presentation Feasibility	86.67	Feasible
Language Feasibility	90.00	Feasible
Average	88.02	Feasible

Table 1 above shows the results of the material expert assessment on the blended learning-based Physical Education learning module, namely in the aspect of Content Eligibility 87.38% (feasible), the aspect of Presentation Feasibility 86.67% (feasible), and the aspect of Language Feasibility

90.00% (feasible). Based on the material expert's assessment of the product developed, it falls into the feasible category. The results of the material media assessment of the blended learning-based Physical Education learning module are presented in Table 2.

Table 2. Data of media expert assessment results

Aspect	Percentage (%)	Category
Module Size	87.50	Feasible
Module Cover Design	88.19	Feasible
Module Content Design	89.77	Feasible
Average	88.49	Feasible

Table 2 above shows the results of the media expert's assessment of the blended learning-based Physical Education learning module, namely in the aspect Module Size 87.50% (feasible), the aspect of Module Cover Design 88.19% (feasible), and the aspect of Module Content Design 89.77% (feasible). Based on the media expert's assessment of the product developed, it falls into the feasible category.

Test product effectiveness

After the product is validated and feasible based on expert assessment, the next step is to test the effectiveness of blended learning-based learning modules on Physical Education learning outcomes. Physical Education learning outcomes are limited to the assessment of cognitive aspects through multiple choice tests. The effectiveness test procedure is that the experimental class is given a blended learning-based learning module and the control class is not given a blended learning-based learning module. The effectiveness test was conducted in 6 elementary schools, the determination of experimental and control groups was carried out by random sampling, where there were 41 experimental class students from 3 elementary schools and 38 students from 3 elementary schools. The effectiveness test

procedure is an experimental class using a blended learning-based learning module and a control class without being given a blended learning-based learning module. Learning is focused on one material in the module, namely locomotor basic movement patterns carried out for 5 meetings. The experimental class emphasized blended learning with the Flipped Classroom method. Flipped Classroom is a learning activity or the art of learning (pedagogics) where learners study learning materials through a learning video at home or before coming to class; while in-class activities will be used more for group discussions in solving problems, advancing concepts, engaging in collaborative learning, and questioning each other. The essence of the Flipped Classroom is to flip the way material is delivered, not during the face-to-face meeting between teacher and learners, but before that day. Before the face-to-face meeting, learners study the subject matter in the form of a learning video that has been provided by the teacher. The teacher also prepares learning instructions that learners must study at home. So learners not only listen to the learning video, but carry out learning activities based on the learning material that has been received. The results of the pretest and posttest data of the experimental group and the control group are presented in Table 3.

Table 3. Results of pretest and posttest Physical Education learning outcomes

Data	n	Pretest (Mean ± SD)	Posttest (Mean ± SD)
Experimental Class	41	77.17 ± 3.07	82.15 ± 3.70
Control Class	38	76.76 ± 3.27	79.00 ± 4.11

Based on Table 3, it shows that the Physical Education learning outcomes of the experimental class during the pretest averaged 77.17 and posttest of 82.15, while in the control class during the pretest averaged 76.76 and posttest of 79.00.

The calculation of this normality test uses the Shapiro-Wilk formula, with the SPSS version 21 software program. The results are presented in Table 4.

Table 4. Normality test results

Data	Test	Significance
Experimental Class	Pretest	0.160
	Posttest	0.200
Control Class	Pretest	0.120
	Posttest	0.200

*Sig. ($\alpha \leq 0.05$)

The normality test results in Table 4 above, it can be seen that the pretest-posttest data of the Physical Education learning outcomes of the experimental class and control class obtained a p-value > 0.05, so the variables are normally distributed.

The homogeneity test is useful for testing the similarity of the sample, namely whether or not the sample variants taken from the population are uniform. The results of the homogeneity test of this study can be seen in Table 5.

Table 5. Homogeneity test results

Data	df1	df2	Sig.
Pretest-posttest experimental class	1	80	0.520
Pretest-posttest control class	1	74	0.240

Based on Table 5 above, it can be seen that the pretest-posttest data for the Physical Education learning outcomes of the experimental class and control class obtained a p-value > 0.05, so the data is homogeneous.

The hypotheses in this study were tested using t-test analysis, namely independent samples test using the SPSS version 21. The results of hypothesis testing are explained as follows:

Table 6. Analysis independent samples test experimental class with control class

Physical Education learning outcomes	t	Sig. (2- tailed)	Difference
Experimental Class-Control Class	3.586	0.001	3.15

Based on the analysis results in Table 6 above, it can be seen that the t count is 3.586 and the p-value is $0.001 < 0.05$, so this result shows that there is a significant difference in the learning outcomes of Physical Education experimental class and control class. The difference in learning outcomes of Physical Education experimental class and control class is 3.15. It can be concluded that the learning module based on blended learning is effective in improving Physical Education learning outcomes.

Discussion

The results showed that the blended learning-based learning module developed was feasible and effective in improving

Physical Education learning outcomes. Teaching materials incorporated in the blended learning model are designed to foster a new learning environment, stimulate enthusiasm, particularly for independent study, and significantly impact learning outcomes aligned with basic competencies and objectives. Post-development research indicates that the module enhances student engagement due to its intriguing content, including animations, sounds, and videos. This mix of online and in-person elements in the module keeps students interested and enthusiastic about learning.

The culmination of this research is a blended learning-based module, tailored to enhance Physical Education outcomes. The

learning is designed based on activities related to a number of types of physical movements or sports and efforts to maintain health that are suitable for Class IV elementary school students. The module's activities aim to encourage enjoyable participation in physical movement and exercise, fostering awareness of health benefits and related factors. The module is structured by emphasizing the approach of the spirit of sportsmanship, honesty, discipline, tolerance, respect for oneself and opponents, cooperation, and responsibility. Thus, material presentations often start with real-life examples of sportsmanship, honesty, discipline, and other key attitudes. Each material segment concludes with a practical task, often situated at the end of an ability test. The aim is for learners to have a broader insight and have the ability to choose a method that they think is more effective. The main division of this module is by chapters. Each chapter begins with "basic competencies", "learning objectives", "the role of teachers and parents". This is followed by a description of the material and the values contained therein. At the end of each chapter, "exercises" and "summaries" are presented. After the summary, a "reflection" is presented. "Assessment" which contains exercise questions is presented after the summary. There is an "assessment rubric" to assess students. At the end of this module, there is also a glossary, answer key, and bibliography. The module is web-based, incorporating text, audio, video, and multimedia, and is ideal for self-study periods. The self-study component of these blended learning modules mirrors the face-to-face interaction in composition. Modules are teaching materials that are systematically arranged and designed to provide experience and fulfill learning and evaluation objectives. The blended learning module is basically a combination of the advantages of face to face learning and e-learning [19]. The blended learning model has emerged as a new methodological approach and related studies show that blended learning has improved all pedagogical variables of learners such as motivation, learning time, satisfaction, and knowledge [20]. Blended learning is more flexible and accessible than conventional learning. It trains students' independence to seek and develop the information obtained [21].

The implementation of blended learning is a combination of various activities using e-learning technology media to create a learning program that is able to optimize the potential of specific learners. Blended learning consists of two types of learning: synchronous and asynchronous. Synchronous learning is learning that is conducted at the same time despite being in different locations, while asynchronous learning is learning activities that are conducted at different times and places for the same material [23–25]. Blended learning can be set with a composition of 50% for face-to-face learning activities and 50% online learning or some use a composition of 75%: 25% or 25%:75% [26, 27].

One of the advantages of blended learning is the opportunity to be able to access the material even if not present in conventional learning and can adjust the learning process to

the characteristics and learning style of the learners themselves. This ease of learning will certainly help students understand the learning material well. The implementation of Blended Learning certainly provides many benefits, one of which is to increase students' independence in learning. This is because the independence of learners in accessing material through digital media is needed when face-to-face learning cannot be carried out. In addition, the application of blended learning is also proven to improve students' knowledge and learning outcomes.

The results of previous research show that blended learning increases the motivation of students' learning achievement [28, 29]. The blended learning strategy can increase learning motivation compared to the conventional model. The blended learning model provides opportunities for students to become active learners and can increase students' learning motivation. It is expected that when students become active and motivated learners, it can improve students' learning activities and outcomes. Blended learning provides opportunities to communicate, discuss, and participate for students actively, facilitating students to get more material and have broader knowledge [29].

The results of this study and several previous studies show that learning modules based on blended learning are effective in improving Physical Education learning outcomes. Modules have various benefits, both in terms of student interests and teacher interests and students can understand the subject matter easily. The utilization of teaching materials in the learning process has a very important role, both for teachers, and for students so that learning is more effective, efficient, and does not deviate from the competencies to be achieved. Therefore, the development of a blended learning-based module is very appropriate to cover the shortcomings of the previous textbook, so that students can more easily learn and understand the subject matter.

Conclusions

The results showed that the blended learning-based learning module developed was feasible and effective in improving Physical Education learning outcomes. Web-based modules, utilization of text, audio, video, and multimedia and can be done during self-study. The development of blended learning-based learning modules is a means and motivation to learn in facilitating the learning process in improving student learning outcomes. Other researchers can conduct further research using blended learning-based learning modules covering more aspects and applying them to different learning materials.

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