

Improving students' martial arts skills and fitness through an innovative e-module

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ABSTRACT

The aim of this study was to develop the Physical Education, Sports, and Health module by incorporating pencak silat material along with physical fitness activities to enhance the physical fitness of seventh-grade students. The Borg and Gall model, which comprises potential and issues, data gathering, product design, design validation, design revision, product testing, and product revision, was the research methodology that was employed. Lecturers, instructors, and students composed the research population. Validation sheets were used for validators and questionnaires were used for students during the data gathering phase. Professionals in the martial arts used a grid to evaluate students' skills. In the meanwhile, to evaluate students' physical fitness, the Harvard Step Up Test was used. The following results were obtained: 1) The last module (E) is highly practical to utilize as martial arts lesson material for class VII students, along with physical fitness training exercises. 2) Utilizing e-modules to learn can enhance students' proficiency in fundamental martial arts techniques. 3) Students' physical fitness improves when physical fitness training exercises are integrated with martial arts skills. In conclusion, the pencak silat learning e-module, which is backed by physical fitness training, is deemed extremely viable to be utilized as teaching material and enhance students' physical fitness.

KEYWORDS

Digital Learning; Physical Education; Skill Development; Student Engagement

1. INTRODUCTION

In today's digital era, the integration of technology in education has become an urgent need to improve the effectiveness and efficiency of the learning process. Especially in physical education, sports, and health, there is a need to develop innovative and adaptive teaching methods so that students can master physical skills and obtain optimal health benefits (Arwandi et al., 2023; Putra et al., 2023). Pencak Silat, as one of Indonesia's cultural heritage, has great potential to be used as a learning material that not only teaches martial arts skills, but also improves students' physical fitness. However, conventional teaching methods are often less effective in engaging students and maximizing their potential (Bafirman et al., 2023; HB et al., 2023). Therefore, a more modern and attractive approach is needed, such as the use of interactive and easily accessible e-modules.

The development of the Pencak Silat e-module accompanied by physical fitness exercises for grade VII students is an effort to answer these challenges. Using the Borg and Gall research and development model, this e-module is designed to be a practical and effective learning tool. Through validation and trials involving lecturers, instructors, and students, this e-module is expected to be able to significantly improve the basic skills of Pencak Silat and students' physical fitness. The data analysis method used also ensures that this e-module is not only theoretical, but has also been proven to be effective through field tests. Thus, the development of this e-module is not only relevant in the current educational context, but also contributes to the preservation of culture and the improvement of the quality of students' health (Munir et al., 2024).

The absence of infrastructure and facilities to support students' success in meeting learning objectives, such as full sports facilities and equipment, particularly for martial arts, like mattresses, belts, toys, and machetes, and the lack of sufficient infocus to support learning, makes it challenging for both students and teachers to maximize teaching and learning activities. Because inadequate infrastructure and facilities will interfere with the learning process, making teaching and learning activities ineffective and inefficient. Similar to this, less engaging instructional materials like pictures and sporting goods are altered because there isn't enough concentration to show other materials like videos and powerpoints. Facilities and infrastructure also affect a person's physical activity, physical activity will determine a person's physical fitness. Perform physical activity with vigor and increase resistance to Fatigue (Cattuzzo et al., 2016; Gray et al., 2015). Exercise is an effective thing to improve one's fitness, Exercise can improve physical fitness reduce fatigue and improve health-related quality of life (Dieli-conwright et al., 2018; Kampshoff et al., 2015).

PJOK stands for physical education, sports, and health. All three learning domains—cognitive, emotional, and psychomotor—are used in PJOK. Sports and physical education integration are long-standing and beneficial initiatives to raise the caliber of human resources (Padli et al., 2022). Education is one of the pillars of a nation's progress. Education is a means to lead to the growth and development of the nation (Saputri et al., 2022). Every educational institution finds that both offline (face-to-face) and online (distance learning) learning activities are challenging, as shown by the fall in students' theoretical and practical knowledge. This is demonstrated by the low level of student engagement at GeSchool during online instruction, which leaves most students unsure of what to study and how to complete assignments during in-person instruction. An e-module is instructional material that can be seen on an Android smartphone or computer that displays text, photos, videos, and animations (Kusumayanti & Astuti, 2021).

Martial arts athletes must have good physical fitness (Patah et al., 2021). According to Pencak Salt, a lot of strength and conditioning regimens frequently overlook one of the most important aspects of movement: preactivity. It will be beneficial to use movement screening to develop competency without payment. Furthermore, those who exercise poor movement patterns will continue to increase their risk of injury, adding "fitness to movement dysfunction". Martial arts practice will be more successful if one is physically fit because it involves basic motions (Bodden et al., 2015).

Learning modules are learning resources other than teachers that are systematically designed by experts in certain fields of study or teaching professions according to design principles to increase effectiveness, efficiency, and increase student interest in learning to continue learning (Oktariyana & Oktariyani, 2020). The likelihood that a lesson or piece of information will be retained and comprehended increases with the number of senses the body uses to process it. In order to achieve learning objectives in the age of globalization and prepare for a larger life, learning via the web, applications, or online will thus become more and more important.

Since the primary goal of exercise is to improve health and wellness, it is typically scheduled, repeated, and structured, setting it apart from physical activity. Reduced physical activity resulting in a loss of muscle mass (sarcopenia), a drop in aerobic capacity, a reduction in mobility, and other fitness variables are frequently linked to age-related physical decline and loss of adequate functional ability. (Bullo et al., 2015; Fletcher et al., 2018). Physical function is the capacity of an individual to perform physical activity of daily life. Physical functions reflect motor and control functions, physical fitness (Langhammer et al., 2018). Fitness in children and adolescents is considered an

important indicator of health-related outcomes (Gu et al., 2016). All people, even those with long-term medical issues, are advised by the U.S. Physical Activity Guidelines to participate in moderate-intensity exercise for at least 150 to 300 minutes per week, if feasible. Frequent exercise and recreational activities improve life quality and may even lengthen life (Anderson & Durstine, 2019; Nyenhuis et al., 2020).

The development of the times has also resulted in a lack of physical activity of adolescents, so that the level of physical fitness of students, especially at the adolescent level, is decreasing. Findings from previous research observational studies consistently related, physical inactivity, resulting in low fitness (Look, 2016). Physical fitness is one of the most important things for daily life. Especially in the current conditions of the Covid-19 pandemic which makes activities more limited, especially teenagers who are relatively low (Pristianto et al., 2022). The pandemic has been influenced by various sectors in the world, including in the way education is provided (Erianti et al., 2022). In fact, this should be an impetus to be more active in activities with the aim of health and fitness to avoid viruses and diseases and be able to carry out daily activities better. One of them is to exercise regularly. Educators need solutions to some of these problems, one of which is to provide engaging learning through learning modules. Learning e-modules are able to display material through various senses of the body, such as the sense of sight and the sense of hearing. Thus, if more of the body's senses receive information, the easier it will be for students to accept and understand learning.

2. METHODS

This study was a research and development (R&D) study. Development Research is an effort to develop a certain product and test the validity of the product that has been made and to test the effectiveness of the product that has been produced (Cao et al., 2022). The development model used in this study is the Borg and Gall model. The Borg and Gall development model consists of 10 stages that can be seen as in Figure 1.

This study was conducted in Padang City, at SMP Pertiwi Siteba, SMP Angkasa Lanud, and SMP IT Budi Mulya. The months of October through November were the study's research period. The subjects of the research that was conducted were the students of SMP IT Budi Mulya Kota Padang, SMP Angkasa Lanud, and SMP Pertiwi Siteba. Respondent questionnaires and validation sheets (material elements, language, and media/IT) were the instruments employed. The Harvard Step Test was also utilized as one of the study tools to determine if students' physical fitness levels increased after learning Pencak Silat with the assistance of physical fitness activities as opposed to

before utilizing e-modules and physical fitness exercises. The assessment of martial arts learning outcomes and the improvement of students' physical fitness were carried out twice, namely pre-test and post-test.



Figure 1. Stages of the R & D development model

Data analysis techniques in the validity test in the analysis used the assessment scale table as follows:

Table 1. Grading scale

Score	Category
4	Worth using without revision
3	Worth using with minor revisions
2	Worth using with major revisions
1	Not worth using

Source: Arikunto (2010)

Data analysis of the expert team validation questionnaire results followed these steps: (1) summing the scores obtained from each category, (2) determining the score category as set, and (3) applying the score to the following formula:

$$P = \frac{F}{N} \times 100 \%$$

Source: Arikunto (2010).

Note. P; Score percentage: F; Number of scores obtained: N; Maximum number of scores

As for the percentage criteria for validation questionnaires by experts, they were categorized as follows (Table 2):

Table 2. Expert validation questionnaire percentage criteria

Percentage Range (%)	Qualitative Criteria
86-100 %	Very Decent
71-85 %	Very Good
56-70 %	Good
41-55 %	Less
<40 %	Ugly

Source: Arikunto (2010)

3. RESULTS

3.1. Model Development

a) Potential and Problem Stage

The existence of potentials and challenges is what drives this development study; the potential stems from the rapidly expanding field of technology, particularly the Internet. In order to meet learning objectives, it is still necessary to address the issue of the teaching materials supplied by the Padang municipal government and the school. This will make the learning process more effective and efficient. As a result, the writer plans to create an online learning module about PJOK Pencak Silat content that incorporates exercises to improve physical fitness.

b) Data Collection Phase

- **Material Assessment:** The martial arts curriculum was selected because, as the background section explains, it is crucial for students to comprehend and become proficient in this subject. Similarly, developing physical fitness is a prerequisite for learning martial arts techniques and is the focus of PJOK instruction in schools. The content is updated to reflect the most recent 2013 curriculum revision.
- **Creation of E-Modules:** After determining the material that will be packaged in the form of a learning e-module, the next stage is the assessment of the e-module creation device using the Inshot and Canva applications.
- **Product Design:** After collecting the data, then make a preliminary product planning of the learning e-module using Canva. In designing learning e-modules using several book and journal sources as material guides.

c) Design Validation Stage

The results of the valid material test by three validators consisting of one lecturer and two PJOK teachers at Padang City Junior High School on the learning module of Physical Education Sports and Health material Pencak Silat accompanied by physical fitness training activities were declared "very

feasible" with a percentage of 96.66% of 15 statement items (Table 3).

Table 3. Material Valid Test Results

Validator	Amount of Data	Percentage	Category
1	57	95 %	Very Decent
2	58	96, 66 %	Very Decent
3	59	98, 33 %	Very Decent
Average	58	96,66 %	Very Decent

The results of a valid language test by Indonesian experts on the learning module of Physical Education Sports and Health of Pencak Silat material accompanied by physical fitness training activities were declared "very feasible" with a percentage of 92.5% of 10 items of statements (Table 4).

Table 4. Valid Language Test Results

Validator	Amount of Data	Percentage	Category
1	37	92, 5 %	Very Decent

The results of a valid media / IT test by an expert from electronic engineering on the learning module of Physical Education Sports and Health material Pencak Silat accompanied by physical fitness training activities were declared "very feasible" with a percentage of 92.5% of 15 statement items. Based on the valid test results of the three aspects above, it can be concluded through the following figure (Figure 2).

Table 5. Media/IT Valid Test Results

Validator Name	Amount of Data	Percentage	Category
1	54	90 %	Very Decent

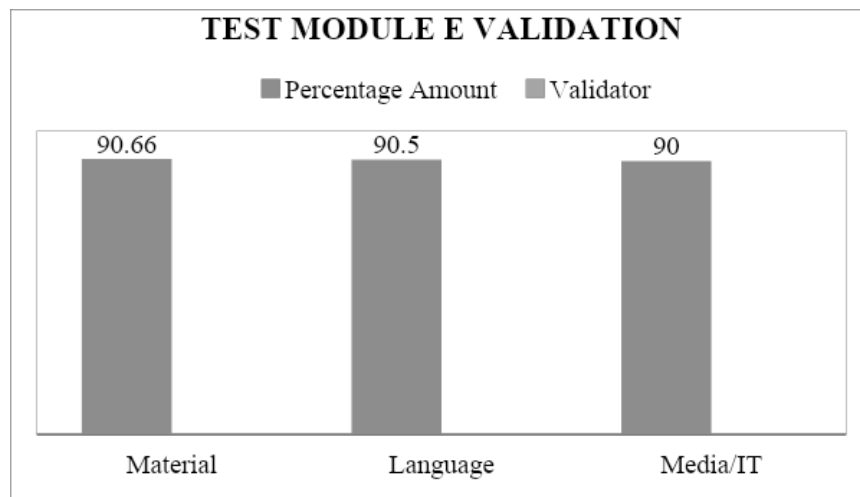


Figure 2. Histogram of Module E Validation Test Results

Based on the figure above, it can be concluded that the resulting e-module product is "very feasible" with an average percentage of 93.05% to be used as teaching material for Sports Physical Education for class VII Pencak Silat material.

d) Design Improvement Phase

Enhancing the design that professional validators deem inadequate in terms of language, performance, graphic design, simplicity of use, and content feasibility comes next, following the completion of product validation. It is extremely possible to test the learning module e based on the legitimate test results. On the other hand, as much of the revisions found when the test is legitimate should be fixed in order for the final e-module to be a better product to be tested. The Canva app is where design enhancements are performed immediately. The updated product's more thorough explanation is provided below (Table 6):

Table 6. Suggestions and follow-up validation e modules

No	Validator Name	Suggestion	Follow-up
1	X1	1) Pay Attention to the Camera Angle 2) Improve hindrance and elakan techniques 3) Add Audio	1) Images and Videos have been improved according to a good camera angle
2	X2	1) Pay attention to sentence hyphens/conjunctions 2) Use sentences according to KKBI	2) The avoidance and elakan technique has been improved as suggested
3	X3	1) Pay attention to the video pauses that are still broken 2) Instruments should be minang	3) There is already audio in the e module
4	X4	1) Pay attention to how motion shots and videos are shot	1) The hyphen in the sentence has been adjusted to the punctuation rules
5	X5	2) Fix videos that are less clear in motion	2) Sentences that do not match the KBBI have been corrected

Although the e module has been classified as highly feasible to test, it is evident from the above table that some things still need to be revised at the valid test stage. To improve the final

product, researchers make the necessary improvements in accordance with the suggestions made by the validators who have previously submitted their work. Thus, the module's degree of practicality is rather respectable.

e) Product Trial Phase

Using the same activity process—that is, teaching without the use of e-learning modules at the first meeting—small-scale trials, or phase 1, and large-scale trials, or phase 2, will be implemented. At the second meeting, deliver instruction via e-learning courses. Using a questionnaire sheet with fifteen statement items, students are assessed on the e-module. The following are the data from the phase I trial:

f) Product Revision Phase

In accordance with the results of the test carried out, there are several things that are notes / suggestions from students at the trial stage as follows (Table 7):

Table 7. Product trial responses

Follow	Up Responses
<ul style="list-style-type: none"> • 1) Cannot be used without an internet package. • 2) Only accessible via link. 	<p>1) This is indeed one of the disadvantages of using e modules because it cannot be used when offline (without an internet network) and must be online (using the internet network).</p> <p>2) The resulting module e can indeed be accessed via a link. However, actually e modules can also be shared in the form of videos but the duration has been determined when downloading e modules. So it is better to use the link because the user can use the e module according to the desired duration.</p>

In addition, researchers also analyzed how the results of using the e module on the basic technical skills of martial arts learners. The assessment process was carried out by Mr. Aldi Indra Kurniawan, a class III provincial jury referee.

3.2. Product Assessment

a) Valid Test

The valid test stage involves 5 experts, 3 of whom are lecturers and 2 of them are teachers of Padang City Junior High School. Based on the valid e module test conducted, a percentage result of 93.05% was obtained with a very feasible category.

b) Trials

The trial phase was carried out 2 times. The phase 1 trial showed that the resulting module e was in the category of strongly agreeing with a percentage of 90%. Meanwhile, in trial phase 2, it was shown that the resulting module e was in the category of strongly agreeing with a percentage of 88%.

3.3. Skill Assessment

The ability of pencak silat skills of learners when before being given learning through e modules and after being given learning e modules shown in Figure 3 below:



Figure 3. Martial Arts Skill Ability

Based on the figure above, it can be seen that the students' martial arts skills improve after being given learning through the learning module.

3.4. Physical Fitness

The level of physical fitness of students before and after being given training through the martial arts module along with physical fitness training activities is depicted in Figure 4.

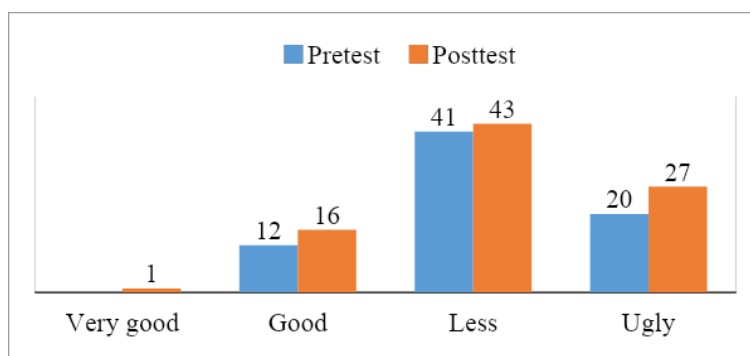


Figure 4. Physical fitness chart

Based on the figure above, it can be seen that the physical fitness of students increases after being given learning through e learning modules that contain physical fitness training activities.

Module Eligibility

With a 94% feasibility rate, the content in learning module e pertains to the 2013 Curriculum and is in line with SK and KD. To make it easier for students to use the e-modules, the presentation of the learning modules is organized methodically. The learning module includes interactive assessments, audio, video, and graphics (Voithofer, 2005). This can support students' learning in the classroom by helping them comprehend the material in both theory and practice, especially for independent study. The information is presented in the following order: cover, pre-introduction, learning, and assessment in the form of quiz questions.

Module Effectiveness

When the E Pencak Silat learning module is utilized in combination with physical fitness activities, students' learning process is positively benefited. Based on the researchers' firsthand observation of the courses and questionnaire evaluations, three classes from three different schools in Padang City—SMP Pertiwi Siteba, SMP Angkasa Lanud, and SMP IT Budi Mulya—followed the learning process via an e-module that was enthusiastically constructed. With remarkable success, students follow the content provided in the e-module. The success of learning activities is greatly influenced by how fervently they are embraced and pursued. Students can enjoyably read, watch, listen, ask questions, and mimic the movements on the e-module. Good assessments, together with well-presented information and resources, can encourage students to adhere to their learning objectives (Ng et al., 2022). From monotonous learning can become interactive learning, so as to create better learning outcomes.

4. DISCUSSION

This study showed that the Pencak Silat e-module developed using the Borg and Gall model has high effectiveness in improving the skills and physical fitness of grade VII students. The validation process involving lecturers, instructors, and students ensures that these e-modules are not only appropriate to the curriculum, but also engaging and easy for students to understand. The results of the trial show that students who use this e-module have a significant improvement in mastery of basic Pencak Silat techniques. This suggests that digital approaches can provide a more immersive and comprehensive learning experience compared to traditional teaching methods (Huang et al., 2021).

In addition to improving martial arts skills, the study also highlights the improvement of

students' physical fitness as a result of the use of e-modules. Physical fitness exercises integrated in the e-module provide double benefits for students, namely mastery of Pencak Silat techniques as well as improving physical fitness. The use of the Harvard Step Up Test in physical fitness evaluation showed a significant improvement in students' aerobic capacity after participating in the exercise program provided in the e-module. This shows that structured and planned physical exercise can have a great positive impact on students' physical health (Bafirman, et al., 2023).

The results of this study also confirm that e-modules as learning aids are very practical and easy to use by students. The high percentage of use and positive feedback from students shows that this e-module is well received and effective in the learning process. In addition, these e-modules provide flexibility in learning, allowing students to learn at their own pace and repeat material that has not yet been understood. Thus, this Pencak Silat e-module not only improves students' physical skills and fitness, but also strengthens students' learning motivation and involvement in the learning process.

The results of this study showed that the development of the Pencak Silat e-module combined with physical fitness exercises has a significant positive impact on the learning of grade VII students. The success of this e-module in improving students' basic Pencak Silat skills can be interpreted as proof that technology-based learning is able to provide a more interactive and in-depth learning environment. The use of e-modules allows students to learn Pencak Silat techniques in a more structured and repetitive manner according to individual needs, which may not always be possible in traditional face-to-face teaching. This shows that the integration of technology in learning can provide real benefits and must continue to be developed (Neira et al., 2023).

The improvement of students' physical fitness as a result of the exercises integrated in the e-module also shows that a holistic approach to physical education can provide greater benefits. Well-structured fitness exercises combined with learning Pencak Silat techniques provide more optimal results compared to fitness exercises that are done separately. This shows that the integration of fitness materials in Pencak Silat learning not only improves students' martial arts skills, but also improves their overall physical health. These improvements can have a long-term positive impact on students' health and well-being, which will ultimately contribute to their academic achievement (Munir et al., 2024).

In addition, the good acceptance of e-modules by students shows that digital learning methods can increase student motivation and involvement in the learning process. Students feel more

motivated to learn because e-modules provide a variety of interactive features that make learning more engaging and enjoyable. The flexibility offered by the e-modules also allows students to learn at their own pace, giving them the opportunity to understand the material more deeply without the time pressures typically present in traditional classrooms. This shows that the application of e-modules in Pencak Silat learning is not only effective in improving physical skills and fitness, but also in creating a more inclusive and responsive learning environment to the individual needs of students.

5. CONCLUSIONS

Based on the valid test results, the Pencak Silat learning e-module supported by physical fitness training as teaching material for Pencak Silat material for class VII junior high school students is declared very feasible to be used as teaching material. This is shown from the acquisition of valid material test results data of 96.66% with very feasible categories, for language valid test results that obtained 92.5% with very decent categories and valid media / IT test results that obtained 90% with very feasible categories. Meanwhile, the results of the trial showed that students strongly agreed with the resulting module being teaching material with the acquisition of trial result data of 86.06% of students chose the category of strongly agreeing and 13.94% of the category agreed.

The results of the pre- and post-test of martial arts skills of students in the "low" category increased from 56.25% to 8.75%, the "enough" category from 43.75% to 61.25%, while for the "good" and "excellent" categories, it remained 0%. While the results of the pre and post physical fitness test through the Harvard step test of students in the "ugly" category increased from 80 learners to 50 learners, the "less" category from 0 to 30 learners, while the "enough", "good", "very good" and "excellent" categories remained 0 or none.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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