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Original Article

Improving the martial art skills and physical fitness quality of students grade VII through e-module development

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Abstract
Limited teaching materials are one of the obstacles to achieve learning goals and students' physical fitness. The purpose of developing the Sport and Health Physical Education module of martial art material is accompanied by physical fitness activities of students grade VII in improving the students' physical fitness. This research used Research and Development Borg and Gall model consisting of potential and problems, data collection, product design, design validation, design revision, product trials and product revision. The research population was lecturers, teachers and students grade VII of Private Junior High Schools in Padang with a data collection process using validation sheets for validators and questionnaire sheets for students. The data collection technique was total sampling. The assessment of the skills of learners was carried out by a martial art expert based on the skill assessment grid in the school. Meanwhile, the physical fitness instrument for students uses the Harvard step up test. The data analysis techniques used are the assessment scale and percentage range showed that 1) The resulting module was very feasible to be used as teaching material for martial art material accompanied by physical fitness training activities for students grade VII with a percentage number. 2) Learning using e-modules can improve the ability of students' basic martial art technical skills. 3) Physical fitness training activities combined in martial art skills had a positive impact on improving the students' physical fitness. It is concluded that based on valid test results, the *Pencak Silat* learning e-module supported by Physical Fitness training as teaching material for *Pencak Silat* material is very feasible to be used as teaching material and improve students' physical fitness.
Keywords: E-Module; Martial art skills; Physical fitness

Introduction

The challenge of education today *How to Provide Interesting Learning Media and Learning Materials*, by building E-Modules (electronic modules) to replace previously printed modules, becomes more attractive and more accessible everywhere and anytime according to the habits of millennials and Z generations (Nurramadhani et al., 2020). The module itself is a teaching material that trains students' independence in learning (Shofiyah et al., 2021). In the era of globalization that is being felt at this time, the advanced era requires humans to follow the flow of the times to be able to live more productively. Education is one of the right ways to be the right initiator and user for the times. Only people who have the knowledge and will be able to keep up with the times and make proper use of those developments, whether for themselves, family, business, education and so on. An innovative online learning media is necessary to facilitate directly the social interaction of students with the environment (Haris et al., 2023; Savitri et al., 2021; Sridadi et al., 2021; Sulistiyowati et al., 2022).

As stated in the Law on the National Education System Number 20 of 2003 article 1 paragraph 2 which reads: National education is an education based on Pancasila and the 1945 Constitution of the Republic of Indonesia which is rooted in religious values, Indonesian national culture and responsive to the demands of changing times. Curriculum is a set of plans both regarding the ways, objectives, content and learning materials that will be used as guidelines / guidelines for the implementation of learning activities in achieving predetermined educational goals (BSNP, 2006). The lack of facilities and infrastructure to support the success of students in achieving learning goals such as the unavailability of complete sports facilities and infrastructure, especially martial arts such as mattresses, belts, toya, machetes and the unavailability of adequate infocus to facilitate learning so that students and educators find it difficult to optimize teaching and learning activities. Because incomplete facilities and infrastructure will affect the learning process so that teaching and learning activities will not be effective and efficient. Likewise, less interesting learning media such as images and sports equipment are modified due to the unavailability of adequate infocus to display other media (video and power points). Facilities and infrastructure also affect a person's physical activity. Physical activity will determine a person's physical fitness (Berhimpong et al., 2023; Gierczuk & Wójcik, 2023; Kozin et al., 2023) to perform the 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. It can improve physical fitness reducing fatigue and improve health-related quality of life (Dieli-conwright et al., 2018; Kampshoff et al., 2015).

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Physical education, sport, and health are often referred to as PJOK. PJOK applies all three domains of learning including cognitive, affective and psychomotor domains (Firdaus et al., 2023; Umar et al., 2023; Welis et al., 2023). The implementation of physical education and sport is a long and valuable asset to improve the quality of human resources (Cereda et al., 2023; Mischenko et al., 2023; Nugroho et al., 2021). 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). Online (Distance Learning) and offline (face-to-face) learning activities are learning activities that are not easy for every educational institution as evidenced by the decline in the students' quality both in terms of theoretical and practical understanding. This is evident from the lack of optimal student activity at GeSchool during online learning so that when the face-to-face lesson schedule most students do not know what material they should learn and what tasks they should do. E-module is a teaching material that can display text, images, videos, and animations through computer electronic devices or Android (Kusumayanti & Astuti, 2021). Martial art athletes must have good physical fitness (Patah et al., 2021). *Pencak silat* establishes that many strength and conditioning programs often fail to consider the basic fundamental movement qualities. Pre-activity Movement screening will be advantageous for building competence without compensation. Moreover, individuals who continue to practice using unsatisfactory movement patterns will become more susceptible to injury, thus adding "fitness to movement Dysfunction". Good physical fitness will make practicing martial arts more effective because it requires fundamental movements (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). E-module learning is supported by the Government Regulation of the Republic of Indonesia Number 19 Article 19 (1) of 2005 concerning National Education Standards which states that learning in schools is carried out interactively, inspiring, fun, challenging, motivating students to actively participate. (Azhar, 2007) revealed that interactive e-modules allow students to engage not only the sense of hearing, but also sight. In the field of education, the application of web technology to support student learning more recommended (Cress & Kimmerle, 2008). The more senses of the body used to receive the lesson/information, the more likely the lesson/information will be remembered and understood. Thus, learning through the web / application / online will increasingly help in achieving learning goals in the era of globalization, in order to adapt to a wider life. Exercise is usually distinguished from physical activity because it is usually planned, repetitive, and structured with the main objective of improving health and wellness. Age-related physical decline and loss of appropriate functional capacity are often associated with lack of physical activity leading to a lack of muscle mass (sarcopenia), decreased aerobic capacity, reduced mobility, and other determinants of fitness (Bullo et al., 2015; Fletcher et al., 2018; Ilham & Dimyati, 2021). 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). Hence, 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) The U.S. Physical Activity Guidelines recommend that all adults, even those with chronic medical conditions, should engage in at least 150 minutes to 300 minutes a week of moderate intensity exercise, if they are able. Regular risk activity and exercises provide a higher quality of life and possibly increase longevity (Anderson & Durstine, 2019; Nyenhuis et al., 2020).

Materials & methods

This was a research and development. 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 was the Borg and Gall model. The Borg and Gall development model consisted of 10 stages that can be seen as in the following figure:

Figure 1. Stages of the R & D development model

This research was carried out at SMP Pertiwi Siteba, SMP Angkasa Lanud and SMP IT Budi Mulya in Padang. The time used by the researchers for this study was October-November. The subjects of the study were the students of SMP Pertiwi Siteba, SMP Angkasa Lanud and SMP IT Budi Mulya Kota Padang. The instruments used were validation sheets (material aspects, language and media / IT) and respondent questionnaires. In addition, the research instruments used to measure whether students' physical fitness levels improve after learning *Pencak Silat* with the support of physical fitness exercises compared to before using e-modules and physical fitness exercises, were the Harvard Step Tests. The assessment of martial art learning outcomes and improving students' physical fitness were carried out twice, namely pre-test and post-test. The 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)

The data analysis of the results of the expert team validation questionnaire using the following steps: (1) summing the scores obtained from each category, (2) determining the score category as set, and (3) entering the score into the following formula: P=F/n*100% Source: (Arikunto, 2010)

Information:
P = Score percentage
F =Number of scores obtained
N =Maximum number of scores

As for the percentage criteria for validation questionnaires by experts, they can be categorized as follows:

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)

Results

1. Model Development

a. Potential and Problem Stage

This development research was motivated by the existence of potentials and problems. The potential in this research and development was the rapid development of technology, especially Internet. The problem of teaching materials provided by the school and the Padang city government still needs to be developed so that the learning process can be more effective and efficient in order to achieve learning objectives. Therefore, the researchers developed a learning e-module on the subject of PJOK *Pencak Silat* material supported by physical fitness training activities.

b. Data Collection Phase

a) Material Assessment

Martial art material was chosen because this material was very important for students to understand and master as explained in the background section. Likewise, physical fitness played an important role in mastering martial art skills and was the learning goal of PJOK in schools. The material was adapted to the latest revised 2013 curriculum.

b) Creation of E-Modules

After determining the material that was packaged in the form of a learning e-module, the next stage was the assessment of the e-module creation device using the Inshot and Canva applications.

c) Product Design

After collecting the data, then making 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

1) Material Validity Test

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 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 Sport and Health material *Pencak Silat* accompanied by the physical fitness training activities were "very feasible" with a percentage of 96.66% of 15 statement items.

2) Language Valid Test

Table 4. Valid Language Test Results

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

The results of a valid language test by Indonesian experts on the e-learning module of Physical Education Sport and Health of *Pencak Silat* material accompanied by physical fitness training activities were "very feasible" with a percentage of 92.5% of 10 items of statements

3) Media/IT Valid Test

Table 5. Media/IT Valid Test Results

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

The results of a valid media / IT test by an expert from electronic engineering on the learning module of Physical Education Sport and Health *Pencak Silat* material accompanied by physical fitness training activities were "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.

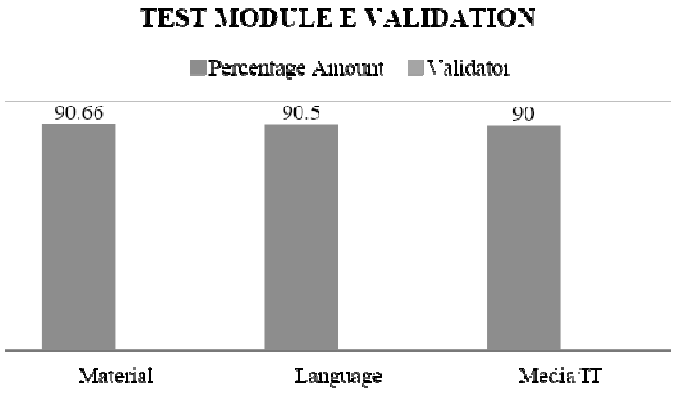

Figure 2. Histogram of Module E Validation Test Results

Based on the picture 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 Sport Physical Education for students grade VII in the *Pencak Silat* material.

d. Design Improvement Phase

At this stage after product validation was completed, the next step was to improve the design that was considered insufficient by expert validators in language aspects, performance aspects, graphic design aspects, ease of use aspects and content feasibility aspects. Based on the valid test results, the learning e-module was very feasible to be tested. However, in order for the resulting e module to be a better product to be tested, then some of the revisions obtained when the test was valid, it should be corrected as much as possible. The design improvements were made directly in the Canva app. The more detailed explanation of the revised product is as follows:

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

Based on the table above, it can be seen that at the valid test stage, there are still some things that need to be revised although the e module has been categorized as very feasible to be tested. However, to improve the resulting product, the researchers improve according to the improvements from the validators that have been submitted above. Therefore, e module has a very decent level of feasibility.

e. Product Trial Phase

f.

The implementation of small-scale trials or phase 1 and large-scale trials or phase 2 were through the same activity process, namely by providing learning without using e-learning modules at the first meeting. Then, provide learning using e-learning modules at the second meeting. Assessment of students on the e-module used a questionnaire sheet consisting of 15 statement items. The data for the phase one trial are as follows:

g. Product Revision Phase

h.

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. Product trial responses

Follow	Up Responses
1) Cannot be used without an internet package. 2) Only accessible via link.	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). 2) The resulting module e can indeed be accessed via a link. However, actually e module 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.

In addition, the 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. The results of the skills obtained are as follows.

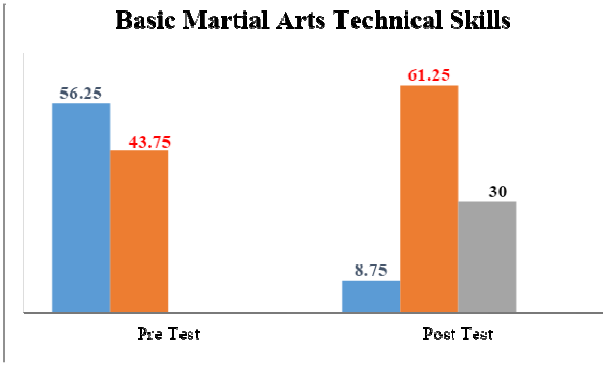

Figure 3. Histogram of Pre and Post Test Skill Results

From the picture above, it can be seen that there is an improved e-learning module on students' basic *pencak silat* technique skills which there was a decrease in respondents with a "low" score. Meanwhile, the percentage showed a decrease in those students from 56.25% to 8.75%, the "sufficient" category from 43.75% to 61.25%, while for the "good" and "excellent" categories remained 0%.

For the level of physical fitness of students, it is also a concern in this study with the acquisition of the following data:

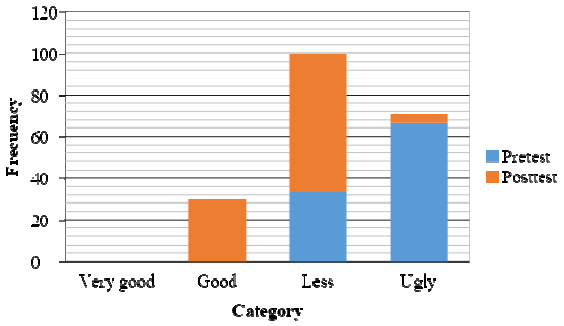

Figure 4. Histogram of Pre and Post Test Physical Fitness Results

Based on the picture above, it can be implied that the learning module also has a good effect on the physical fitness of students. By presenting the form of physical fitness training combined with basic martial art techniques in the form of exercises/games, it becomes a good solution in improving the physical fitness of students. In the "bad" category it 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.

The following is the result of pre-test and post-test analysis of martial arts skills conducted through the development of E-modules using paired samples t-test.

Table 8. Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Pree-Test & Post-Test	-47.137	10.871	1.215	-49.557	-44.718	-38.784	79	0.000

Table 9. Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
Pretest-Post-Test	Equal variances assumed	.018	.894	-36.809	158	.000	-47.13750	1.28060	-49.66680	-44.60820
	Equal variances not assumed			-36.809	157.430	.000	-47.13750	1.28060	-49.66687	-44.60813

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 e module was in the category of strongly agreeing with a percentage of 88%.

3. Skill Assessment

The ability of *pencak silat* skills of students when before being given learning through e modules and after being given learning e modules shown in figure 2 below.

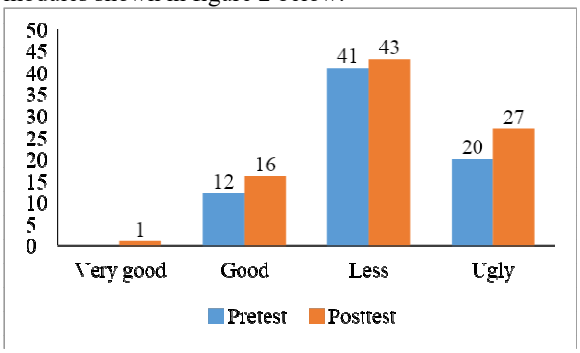

Figure 5. Martial Arts Skill Ability

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

4. Physical Fitness

The level of physical fitness of students before and after being given training through the martial art module along with physical fitness training activities is depicted in the chart below.

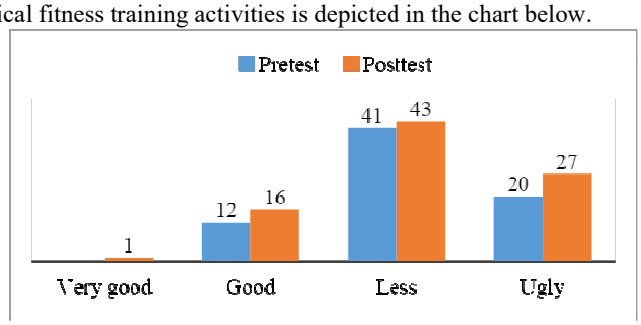

Figure 6. Physical fitness chart

Based on the graph 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.

1. Module Eligibility

The material in the learning module referred to the 2013 Curriculum in accordance with SK and KD with a value of 94% was very feasible. The presentation of learning modules was arranged systematically so that students can use the e modules easily. In the learning module, there were audio, video, images, and interactive evaluations (Voithofer, 2005). This can help students in understanding the subject matter both in the form of theory and practice both studying at school, especially for independent learning. The presentation of the material started from the cover, pre-introduction, learning and ends with an evaluation in the form of questions in the form of quizzes.

2. Module Effectiveness

Pencak Silat learning module accompanied by physical fitness activities that were produced had a positive impact on the learning process of students. A total of three classes from three schools, namely SMP Pertiwi Siteba, SMP Angkasa Lanud and SMP IT Budi Mulya in Padang, have followed the learning process through an e-module that was generated with enthusiasm which was proven through direct observation by researchers and assessment through questionnaires. The students followed very well the learning provided through the e module. Learning activities that are welcomed and followed by enthusiasm are very influential on the success of a learning.They can read, watch, listen, ask questions and imitate the motion on the e module with pleasure. By an attractive appearance, the delivery of good information and materials and the provision of good evaluations can motivate students to follow the learning well (Ng et al., 2022). From monotonous learning then it can become interactive learning so that it can create better learning outcomes.

Discussion

Electronic modules or commonly abbreviated as e modules are one of the evidences of the influence of the development of science and technology in the era of globalization (Tripon, 2022). More and more human activities have been facilitated through technological sophistication, one of which is cellphones that have been widely used by students. This is what is used by researchers in providing solutions to existing problems. Teenagers are a very close age to social media, so this can be used as a strong foothold in providing electronic learning (Crosby, 2020).

Physical Education Learning module containing Sport and Health martial art material accompanied by physical fitness training activities produced was prepared in accordance with the 2013 curriculum and was also adjusted to the characteristics of students who are close to the media. This E module was developed with the Borg and Gall development model. Students can use the e-module anytime and anywhere with a capital cellphone / android. The curiosity of students will increase if a learning is displayed starting from writing and images, followed by audio and video (Andriani, 2022). Thus, the existence of interesting and motivating materials will improve student learning outcomes.

1. Test Validation

The feasibility level of the e module obtained from the validation test stage by material experts, linguists, and media/IT experts is shown through the figure below

Table 11. Module E Validation Test Results

Validator Name	Information	Percentage (%)	Category
X1	Sports Education Lecturer	95	Very Decent
X2	Indonesian Lecturer	92,5	Very Decent
X3	Lecturer of Electronic Engineering	90	Very Decent
X4	PJOK Teacher	96,66	Very Decent
X5	PJOK Teacher	98,33	Very Decent
Total		**94**	**Very Decent**

E The martial art learning module accompanied by grade VII physical fitness training activities has been tested for feasibility based on valid tests by several experts with an average percentage of 94% with the category "Very Feasible".

2. Development of E Learning Module for Physical Education Sport and Health *Pencak Silat* Material accompanied by Physical Fitness Training Activities for Students Grade VII

The e-learning module product developed with the Borg and Gall Model development models was very feasible to use as teaching materials. E-Learning modules that were processed according to the stages of the development model and assisted by the use of the Inshot and Canva applications produce a very effective teaching material to be used in learning in the era of globalization. A form of learning that was very close to the age of students, can be used anytime and anywhere and only requires an internet package and android / computer can already use the e module completely.

Physical fitness was also an important thing to always be linked and needed by every student to be able to carry out daily activities better (Dana et al., 2022). Thus, in this study, the researchers also looked at how the level of physical fitness of students before and after giving e learning modules in which there were physical fitness training activities combined with basic martial art technical skills. The Harvard step test was a form of test used to measure a student's level of physical fitness (Bafirman et al., 2023; HB et al., 2023).

3. Advantages of E Module

As explained in the research results, the learning module has many advantages as teaching materials in the era of globalization both for learning outcomes and physical fitness. The advantages of e module are as follows:

a. This e module makes it very easy for teachers to teach *Pencak Silat*,
b. This e module is good for attracting the attention of learners in following the learning,
c. The learning objectives are very clear,
d. This e learning module is appropriately used in martial arts materials accompanied by physical fitness training activities,
e. The material in the e module is very complete from the introduction to the evaluation stage,
f. Learning through e modules makes it easier for students to understand the material presented,
g. Learners are helped in repeating lessons outside of class hours,
h. The design of the e module is very attractive for adolescent learners,
i. The size and typeface can be read clearly,
j. The language used is easy for students to understand.

Disadvantages of E Module

Of the many advantages described above, the learning module also has several disadvantages, namely:

a. E learning module can only be used online or connected to the internet,
b. Not all types of android can use e modules to the maximum,
c. E module requires a good/stable network in order to be used optimally.

Research Limitations

This research has been carried out well, but there are several things that are limitations of the research, namely:

d. There is a small percentage of students who do not have a cellphone / Android that can be used optimally in the use of e modules.
e. The use of e module cannot be used if there is no stable network and internet package (online).
f. This module e is applied when changing the curriculum in grade VII. At the stage of applying the e module of martial arts material in that semester, there is no and only in the next semester of the Merdeka Curriculum, which was only tried at the beginning of the odd semester in 2022. Thus, the researchers had difficulty in asking for research permission to the school because the material to be displayed was not being studied in that semester.

Conclusions

In conclusion, the research and development efforts focused on the creation of the Sport and Health Physical Education module for martial arts, tailored to the needs of students grade VII, have proven highly successful. The meticulous application of the Borg and Gall model ensured a comprehensive development process, from identifying potential issues to refining the module based on expert validation and student feedback. The resulting e-module emerged as a highly viable and effective teaching resource, as evidenced by its exceptional feasibility rating. The integration of martial art material with physical fitness activities has not only enhanced students' fundamental martial arts skills but has also demonstrated a positive impact on their overall physical fitness. This study underscored the significance of a holistic approach to physical education, where martial arts and fitness training are seamlessly integrated, contributing not only to skill development but also to the broader goal of improving students' physical well-being.

Furthermore, the conclusive findings affirm that the *Pencak Silat* e-learning module, supplemented by physical fitness training, represents a significant advancement in pedagogical tools for Private Junior High Schools in Padang. The success of this research not only lies in the development of a well-structured and validated module but also in the tangible outcomes observed in students' improved martial arts skills and enhanced physical fitness. This comprehensive approach to physical education is poised to contribute significantly to the overarching objective of fostering a healthier and more active student population. As a result, the developed e-module stands as a noteworthy contribution to the field of physical education, providing a valuable resource for educators and institutions seeking to promote both martial art proficiency and holistic physical fitness among students.

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