



## Development of Teaching Materials With Thinkable Applications to Support Blended Learning in Tennis

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### Abstract

This research aims for the future to facilitate Physical Education Study Program students with various teaching materials to support blended learning. Learning. Especially teaching materials that help students' cognitive learning. Because it is known that nowadays and with the sophistication of technology, learning can be done anywhere and at any time by students. In fact, this also makes the college learning process easier because having teaching materials as a learning resource for students can help learning in lectures become more effective and efficient. Because having additional teaching materials as a student learning resource will enrich student knowledge. Specifically for this research, teaching materials will be developed using the Thinkable Tennis Court application. In the future, there will be gradual development for other types of teaching materials and other materials as well. As is known, the physical education study program is closely related to learning movement. Learning to move yourself is also divided into several stages which include cognitive, associative and automatic stages. The cognitive stage is the beginning and basis that influences success at other stages. Because it is necessary for an educator to provide effective and efficient learning at this stage and provide enrichment of knowledge to students by using up-to-date teaching materials in accordance with current developments. The method to achieve this goal will be Research and Development from year to year. What is certain is that the Research and Development stage begins with needs analysis, product development, validation, testing and publication.



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## INTRODUCTION

Physical exercise and physical education are closely related. Students engage in physical tasks such as mastering motion to develop a skill. The biological, movement, psychological, and social aspects of physical education and sports are related to the idea of balanced and integrated personality development (Corbin, 2021). From this claim, it is clear that one of physical education's goals is to help students learn through movement. The three stages of learning movement, according to (Montero-Carretero & Cervelló, 2020) are the cognitive learning stage, the associative learning stage, and the autonomous learning stage. The mastery of motions signals the transition from the associative stage to the autonomous stage, which can be understood to signify the same thing as the automation stage. Given that the cognitive stage is recognized to be the first in the learning motion phases, success in learning motion can be based on this cognitive stage. As previously mentioned, in order to process knowledge and put it to use in real-world situations, learning and understanding must be deepened through the development of cognitive abilities (Ortelli et al., 2021).

The cognitive stage decides whether learning is successful and even has an impact on the following stages of learning movement in physical education. The conditions and learning capacities of students must therefore be well understood by educators when teaching. Understanding the qualities of students' learning styles is one of the most critical

things for teachers to do (Raibowo & Nopiyanto, 2020)

Students who learn best visually prefer to learn through observation. The fact that they prefer information presented graphically, such as through charts, graphs, maps, posters, and displays, indicates that they have an excellent visual memory. Given these types of student learning preferences, educators must be able to offer learning environments that are appropriate for visual learners (El-Sabagh, 2021). People with an auditory learning style learn best when they first listen to verbal instructions such as lectures, dialogues, or recordings. As a result, teachers can offer classroom settings where children can learn through the use of sound (Childs-Kean et al., 2020). Although kinesthetic learning styles are more suited for physical education, students still need to engage in other learning types. For instance, sports instructions and games can still be given in written or aural form (Bostanci, 2020). This can also be a difficulty for kinesthetic learners, who will learn better through demonstrations and from engaging in these activities themselves (Canpolat, 2019).

Students in the Physical Education Study Program who attend Field Tennis lectures carry out learning by utilizing learning resources that support their visual and auditory learning styles. They usually do it outside of lecture hours which can later be used as provision for the face-to-face learning process by utilizing kinesthetic learning styles (Oktova & Rahmi, 2021).

However, what is problematic is the audio-visual learning resources that students learn are not the same from one student to another. This is what makes the difference in perceptions and principles when face-to-face learning during lecture hours. In addition, there are students who learn from sources that are less credible, so that it affects the truth and validity of the material being studied, which is less reliable and less accountable. Therefore it is necessary to carry out research and development to provide learning resources and audio-visual teaching materials for tennis with the help of a thinkable application for Physical Education Study Program students, so that the contents of the material can be trusted and students can have the same perception as lecturers and other student friends as well as other sources. Learning can be accessed anytime and anywhere.

## METHODS

The research design or approach used in this study is by using research and development research designs or research and development. Because indeed the problems have been found, one way to solve the problem is to develop a product in the form of teaching materials to support Student Blended Learning by using thinkable applications (Nind et al., 2020). However, because the development itself is in the form of something new for the environment, the development is managed in a research. Usually with a product that has been developed, the problems and needs that

are visible during the needs analysis will be resolved and fulfilled with the product development in question.

In developing this teaching material using a procedural approach, namely a descriptive approach that outlines the steps taken to produce a product. In the context of this research, the researcher refers to the development model (Lee & Owens, 2000) with the following steps: (1) Potential and problems, (2) Data collection, (3) Product design, (4) Design validation, (5) Design revision, (6) product trial, (7) product revision, (8) trial use, (9) product revision and (10) mass production. However, this research only reached 7 steps, namely product revision due to limited research time.

The data analysis technique used in this study used descriptive statistical analysis. The measurement technique used in data collection is using a Likert scale. The Likert scale is used to measure attitudes, opinions, and perceptions of a person or group of people about social phenomena (Joshi et al., 2015). The expert evaluation was carried out by four experts, namely one media expert, one learning expert, one evaluation expert, and material expert. Here, expert opinion is suggested as a way to enhance the product under development. Data from subject matter experts, including media experts, learning experts, assessment experts, and trial data, are collected via a questionnaire as part of this research and development. To gather information regarding the evaluation in the form of input, comments, criticism, and ideas

from experts, the questionnaire's format varies for each expert. Additionally, surveys with 45 students will be delivered to pupils along with tools that have been evaluated by specialists. The subject of this study was chosen by a random sampling process. The data processing formula takes the form of a quantitative descriptive study of percentages and data processing classification (Akbar & Sriwiyana, 2010).

$$v = \frac{T_{sev}}{S_{max}} \times 100\%$$

**Table 1.** Classification of Percentage of Data Processing

%	Category	Description
75.01% - 100%	Very Valid	Can be used without revision
50,01% - 75,01%	Valid	Can be used without revision
25,01% - 50%	Invalid	Cannot be used
00% - 25%	Very Invalid	Forbidden to use

## RESULT

Summary The following table explains the findings of the validation by media professionals, learning experts, and evaluation experts:

**Table 2.** Summary of validation results by experts

Component	Findings
Media expert validation with a questionnaire instrument with 29 questions	From the validation results, the results of 5 question indicators are 1) text is 93.75% very valid 2) images/photos are 95% very valid, (3) audio/voice is 95% very valid, (4) video is 91.6% very valid , (5) 96% design/appearance is very valid Suggestions and input from media experts (1) in general the concept that

	has been made is quite good (2) a list of references and sources so that it can be reproduced
Validation of learning experts with a questionnaire instrument with 37 questions	From the results of expert validation consisting of 5 question indicators, namely (1) clarity 91.18% very valid, (2) accuracy (100%) very valid, (3) suitability 91.67% very valid, (4) convenience 100% very valid, (5) 92.86% attractiveness is very valid. Suggestions and input from learning experts (1) the order of the material must be in accordance with the learning process, (2) instructions for using teaching material products
Validation of material experts (practitioners) with a questionnaire instrument of 15 questions	From the validation results consisting of 4 indicators, the results are (1) clarity 80.3% very valid, (2) accuracy 93.75% very valid, (3) conformity 91.67% very valid, (4) convenience 75% valid Suggestions and input from material experts are (1) adding basic techniques and strokes, (2) making material general so that non-campus users can use it, (3) maximizing the quality of scoresheets tutorial video content
Validation of the evaluation expert with a questionnaire instrument with 2 sub-variables with 5 questions/items	From the results of the validation score on material 1 with 15 questions, it is 72.3%, material II is 74.3%, material III is 74.67% Suggestions and input from evaluation experts are (1) the proportion of C1 questions is too much, (2) cognitive dominant questions 1 and 2 for students should be C3-C6

From the results of the small group trial given to 15 students for the

product being developed, the results for the feasibility test are shown in Table

**Tabel 3.** Small group trial

Aspect	%
Attractiveness	90%
Convenience	90%
Clarity	93,9%
Appropriateness	87,5%
Accuracy	91%

From the results of the large group trial given to 45 students for the product being developed, the results for the feasibility test are shown in Table.

**Tabel 4.** Large group trial

Aspect	%
Attractiveness	95%
Convenience	92,2%
Clarity	94%
Appropriateness	95%
Accuracy	94%

## DISCUSSION

The product in this development research is a tennis teaching material with the Thinkable application. This product is presented in the form of a website called thinkable (Defliyanto et al., 2022). The product of teaching materials for tennis is in the form of materials for tennis which consist of (1) history of tennis; (2) facilities and infrastructure; (3) basic tennis techniques; (4) tennis rules and refereeing; (4) video tutorial on how to fill in score sheets; (5) the rules of tennis, which contain examples of cases or problems that occur in official matches and how to solve them in accordance with existing regulations. The advantage of this teaching material is that there are various types of media, such as audio,

video, animation, and text. The researcher agrees with the statement of (Merta et al., 2023) that teaching materials are made with the aim of facilitating independent learning and these teaching materials are formed into a set of printed, audiovisual, or computer-based materials (or any combination thereof). The same thing was also stated by (Eggers et al., 2021) to help explain the concept of ideas and help motivate active learning participants by involving multimedia (computers, laptops and tablets). The combination of appropriate media and learning strategies is also believed by many to be able to increase student motivation to learn. The same thing is also similar to the statement that selecting appropriate procedures involving multimedia will attract students' attention to learning (Sugihartono, 2019)

Tennis courses have the same goals as PJOK learning at school, namely on the cognitive, affective, and psychomotor aspects. However, these three aspects cannot be separated considering that they only focus on one aspect. The results of learning tennis do indeed lead to psychomotor, which is more demanding to be skilled in the ability to move tennis (Raibowo et al., 2023). Therefore, to produce good psychomotor, learning stages are needed starting from cognition, association, and automation (Raibowo et al., 2022). Cognitive aspects are the basis for developing psychomotor and affective aspects will be created if the process of psychomotor aspects supported by cognitive aspects runs smoothly. So that

the cognition process can be developed optimally, one solution is to utilize technology in learning, namely in the form of interactive multimedia which is equipped with quizzes and practice questions. The interactive multimedia is intended to support cognitive aspects which are used to facilitate, increase knowledge, and self-learning for students (Sari et al., 2022).

The interaction between teachers, learning resources and students can be more effective, one of which is with teaching materials in learning. The same thing was also expressed by (Berie et al., 2022) to achieve the specified curriculum targets the existence of teaching materials plays an important role as the easiest source of information for students to practice what is in the material in learning. Researchers also agree with the statement (Munna & Kalam, 2021) that the more choices of available learning resources will make the learning process better. Teaching materials in the form of interactive multimedia, apart from being learning media, are also used as learning resources to stimulate the learning process that is abstract to concrete that can be observed directly (Yusandra, 2021). (Saifuddin et al., 2018) students will find it easier to learn things that are concrete rather than things that are abstract. (Reigeluth, 2016) suggests that effectiveness refers to appropriate learning indicators (such as a certain level of achievement and fluency) to measure learning outcomes. In this context, effectiveness is measured through student learning outcomes obtained before and

after using the product being developed. Discussion should relate the results to current understanding of the scientific problems being investigated in the field. The discussion section provides an opportunity to critically assess the findings of other studies.

## CONCLUSION

The study's findings indicate that the generated product, which has been validated by a number of experts according to their areas of competence, places the finished product in a fairly excellent category and can be used with a few minor adjustments. Additionally, there are differences in score gains before and after utilizing the generated goods, demonstrating the effectiveness of the items on learning outcomes. The goods created can then improve learning time efficiency and stimulate students' interest in the subject matter.

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