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Development of "e-Mole B" Learning Applications in Badminton Games

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Abstract

The lack of technology-based learning media in badminton activities has motivated researchers to develop new technology-based learning media. This media is designed to be user-friendly, making it easy to operate and practice anywhere. This study aimed to develop an electronic-based badminton learning application called "E-Mole B." The research utilizes the research and development or R&D method. Product trials were carried out at SMPN 4 Ciawigebang. With a small sample size of 10 extracurricular student respondents and a large scale test of 35 grade 7 student respondents at SMPN 4 Ciawigebang. The results of this research are based on a small-scale test of 85% in the "feasible" category and a large-scale test of 87.50% in the "feasible" category.

Keywords: *Application, E-Mole b, Badminton*

INTRODUCTION

Badminton is a popular sport in Indonesia. Badminton is a mainstay sport in world-class sporting events that contributes to winning gold. Many Indonesian badminton athletes have reached achievements as top 100 players worldwide. Badminton is a sport that uses a racket as a hitting tool and a shuttlecock as an object to hit and is played by two players (for singles) or two pairs of players (for doubles) with opposite positions on the badminton court separated by a net in the middle of the court (Dewi et al., 2021; Putra & Sugiyanto, 2016). At the educational level, badminton is a small ball game material given in physical education, sports, and health. Badminton games are delivered at all education levels, from elementary to high school (Dewi et al., 2021). The initial stage for mastering badminton techniques starts with the warm-up stage (serving the ball).

The process of warm-up stage basic techniques is accomplished by providing direct explanations followed by examples of movements in front of athletes or by using teaching media as a learning tool, such as providing reading books/knowledge about

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badminton, watching training videos, looking at pictures/posters (in order- order of execution) and so on (Alhusin, 2007; Tomm, 2019). The next stage to master badminton techniques is to try to do/demonstrate the techniques taught repeatedly (practice stage) (Purnama, 2013; Saleh Anasir, 2010). The process of introducing the basic techniques described can be presented simultaneously without having to separate them. Merging can be accomplished using software (software) Macromedia Flash or Microsoft PowerPoint. The merging of these media is known as the final product of interactive multimedia (Sofyan & Purwanto, 2008).

Smartphones with wireless network connectivity, high-resolution displays, multi-touch digital cameras, and light and portable devices open up innovative learning possibilities for students (Johnson et al., 2013; Wright et al., 2013). Increasing interest is focused on using the iPad as a learning device (Dündar & Akçayır, 2014; Falloon, 2013; Hung et al., 2013; Liu et al., 2014; Revell, 2014). Compared with the traditional style, users prefer using smartphones due to their mobility and more intuitive operating methods (Reychav & Wu, 2014). The aligned research result stated that interactive multimedia using Macromedia Flash as learning media is more effective than the traditional style (Sahayu, 2013). In the sports club, researchers observed that basic badminton techniques were introduced to athletes by providing direct explanations followed by examples of movements.

Technical movements in badminton take place quickly between the preparation and implementation phases. With a limited sense of sight, athletes digest information through movement demonstrations (techniques), so coaches move slowly to provide better understanding (Winarno, 2019). However, there is a difference between the actual movement and the movement made slowly to demonstrate the movement to the athlete in the technique introduction process. For example, the shuttlecock often does not hit or reach its destination when demonstrating hitting techniques to students (by slowing down). The use of learning media can overcome the limitations of space, time, and sensory power, such as slight movements that are difficult to see and pay attention to through repeated video playback (Khomarudin, 2018; Winarno, 2019). Learning media will be a solution if we use electronic media to introduce basic badminton techniques (Aripin, 2018).

However, the school researchers observed a need to use more electronic media as a learning tool (Sharples, 2007). The urgency of this research is based on the low use

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of electronic media when practicing basic badminton techniques. In basic badminton techniques, electronic media is used to introduce badminton techniques (Cabelo et al., 2003; Warsita, 2018). However, the schools' researchers observed that they still need to use more electronic media as a learning tool.

Furthermore, the learning media used still needs to be more effective, so there is a need for new media. This research offers the development of an alternative learning media tool called "e-Mole B."

METHOD

This research uses the Research and Development (R&D) method. R&D or Research and Development is research that starts with continuous product testing. Furthermore, the researcher took various steps to obtain good research results in this research. This research stage consisted of several stages: literature study, problem formulation, system development, system testing, and conclusion. The R&D model uses the Software Development Life Cycle with a prototyping approach, namely software development. The first step is to describe the design in prototype form as a functional requirement that the user will approve (Wibowo et al., 2016). The locus for this research is SDN Cipasung, with 58 students in 4th grade. The research flow diagram is described in Figure 1 below.

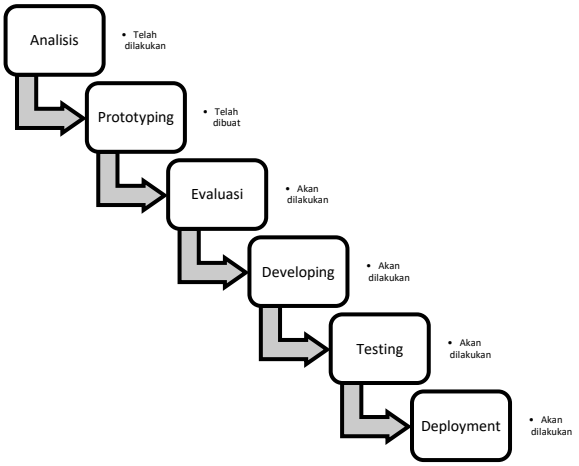

Figure 1. Research Flow Chart

The following is an explanation regarding the diagram:

1. Needs Analysis

In the first stage of this study, the research analyzed student needs. In this needs analysis, the researcher interviewed teachers and several students to acquire

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data as research study material. This analysis showed that students still needed help to serve the ball appropriately. Therefore, the researcher tries to solve this problem by developing a mobile learning application called "e-Mole B" to support students. The application has been completed according to student needs, starting with material, sample, and practice questions.

2. *Prototyping*

A prototype was created From the needs analysis of teachers and several students to illustrate the "e-Mole B" design. As in the following picture:

Figure 2. Front View and Display in "e-Mole B"

Table 1. Contents of the material "E-Mole B."

No	Basic Badminton Skill	Types	Movement Learning Stages Description	Link of Youtube Video Sample	Student/ Payer (Ceklist)	Teacher (Ceklist)	
1	Grip	*Back*	hand The backhand *grip* technique is accomplished by grasping the racket shaft, then positioning the thumb behind the shaft and pressing as if the thumb supports the racket.				1
		Forehand	The forehand grip uses the index, middle, ring, and little fingers as support. Generally, this technique is used for agile playing movements.				
2	Stance	*Defensive Stance*	To apply the defensive position, the *player* must arrange the body facing the net *and position the racket in front of the waist/stomach.*				2
		Net Stance	Net stance is usually accomplished when the opponent tries to play near the net *(netting*). To anticipate *netting,* the current player is near the net. The next step is to position the racket in front of the athlete's body while the body is moved forward slightly so that it is ready to jump forward.				
3	Footwork	*Move only 2-3 steps backward*	Move only 2-3 steps backward				3
		Rearrange only 1 step sidewards.	Rearrange only 1 step sidewards.				
		Move only 2-3 steps	ahead. Move only 2-3 steps ahead.				
4	service	*high serve*	The top serve is accomplished by hitting the ko with a racket above				4

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			the shoulder or head. Usually, the speed of the shuttle tends to be horizontal.	
		Low serve	The bottom serve is done by hitting the shuttlecock with a racket below the shoulder or chest. Usually, the speed of the shuttle tends to soar.	
5	Smash	*Forehand smash*	The *forehand sm*ash technique is a strong shuttlecock blow accomplished above the head.	5
		Backhand smash	T*he backhand smash* technique is one of the most difficult techniques to do in badminton; even professionals find it difficult. The athletes should use the *backhand grip* technique and then release a strong punch.	

3. Application Evaluation and Revision

   The application will be validated by material experts, media experts, and potential users, in this case, students, to get feedback. The feedback obtained is utilized to revise the application design. It is accomplished repeatedly until no more feedback is obtained, so the application design is declared final.

4. *Developing*

   This stage is writing code using a programming language to create an application. The programming language used is HTML, CSS, Javascript, and PHP. The MySQL database supports the program due to the usage of web applications.

5. *Testing*

   After the application is constructed at the developing stage, testing is carried out at the system, small-scale, and large-scale user levels. At the system level, testing is accomplished by testing the functionality of whether the application is

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functioning properly. Furthermore, the small-scale testing stage is carried out by asking several users to use the application to be asked for feedback as a user acceptance test. Furthermore, at the large-scale testing stage, it is carried out using an application as a badminton learning aid for the experimental class.

6. *Deployments*

   If the test results state that the application is complete, the last step is publishing it to the Play Store so everyone can access it.

RESULTS

Results of "e-Mole B" Based Badminton Learning Application Development

Development of application-based badminton learning media. The initial product produced was called "e-Mole B" to Improve Students' fundamental skills. The "e-Mole B," based on a badminton learning application, was developed to provide convenience in learning badminton using applications as learning media.

1. Product Research Results "e-Mole B"

a. Expert Validation

The development of e-Mole B" is validated by experts in their field, specifically an application media expert. The application media validation expert is Sofhian Fazrin Nasrulloh S.Pd, M.Eng. The expert review produced the following results.

Table 2. Results of the Expert Validation Assessment of the First Phase "e-Mole B" application design

No	Statement	Evaluation				Note
		1	2	3	4	
I	**Design Aspect**					
A.	**Contents**					
1.	Size			√		
2.	Design arrangement				√	
3.	Color and display			√		
B.	**Writing**					

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1.	The size of the writing on the guide	√	
2.	Stylists writing guides	√	
C	**Color**		
1.	Basic application color		√
2.	Example implementation guide		√
III	**Usage Aspect**		
1.	Provides user effectiveness		√
2.	Learning is more effective and efficient.		√
3.	Assist teachers in implementing learning.		√

Based on the results of validation, experts produce the following data.

Table 3. Data on the Results of "Development of a Multifunctional Ball Throwing Equipment" First Stage Material Expert.

No.	Rated aspect	Earned Score	Maximum Score	Percentage(%)	Category
1	Application design	30	40	75%	Adequate

Based on the data obtained, it can be concluded that the Badminton Learning Application Based on "e-Mole B" can be categorized as adequate with a percentage of 75%.

2. Small Group Trial

A small group trial was conducted on ten respondents of badminton extracurricular students at SMP Negeri 4 Ciawiigebang, and the trial was conducted in 1 meeting. The circumstances during the small group trial are described as follows. (a) Description of the operating conditions of the tool. (b) Respondents' use of e-Mole B seemed enthusiastic. (c) Conditions when filling out the questionnaire: Respondents pay attention to the explanation regarding the procedures for filling out the questionnaire, and students fill it out carefully.

Table.4 Small Group Trial

No.	**Rated aspect**	**Average Score Obtained**	**Maximum Score**	**Percentage (%)**	**Category**

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1	Application design	34	40	85%	Worthy

The results of the questionnaire of respondents or athletes regarding the "e-Mole B Based Badminton Learning Application" showed that 85% of the assessment regarding the application design aspects were categorized as "Good," which can be interpreted as meaning that the application is suitable for testing to the next stage.

3. Large Group Trial

Field trials were carried out on 35 respondents at SMP Negeri 4 Ciawigebang. Field trials were carried out in one meeting. Conditions during the field trials are described as follows. (a) The respondents seemed enthusiastic and curious and asked the teacher and researcher questions when given an initial explanation regarding the "e-Mole B" research that would be carried out. (b) The condition of using "e-Mole B" shows concentration and enthusiasm. Several students asked about unclear material and procedures for using "e-Mole B." (c) Conditions when filling out the respondent's questionnaire went conducive, starting with the researcher explaining the procedures for filling out the questionnaire. While respondents or athletes pay attention to the explanation regarding the procedures for filling out the questionnaire, respondents fill out the questionnaire carefully.

Table 5. Results of the Large Group Trial Questionnaire

No.	Rated aspect	Average Score Obtained	Maximum Score	Percentage (%)	Category
1	Application design	35	40	87.50	Worthy

The results of the respondent questionnaire regarding the research "Badminton Learning Application Based on "e-Mole B" showed an assessment of the material design of 87.50%, which was categorized as "Proper."

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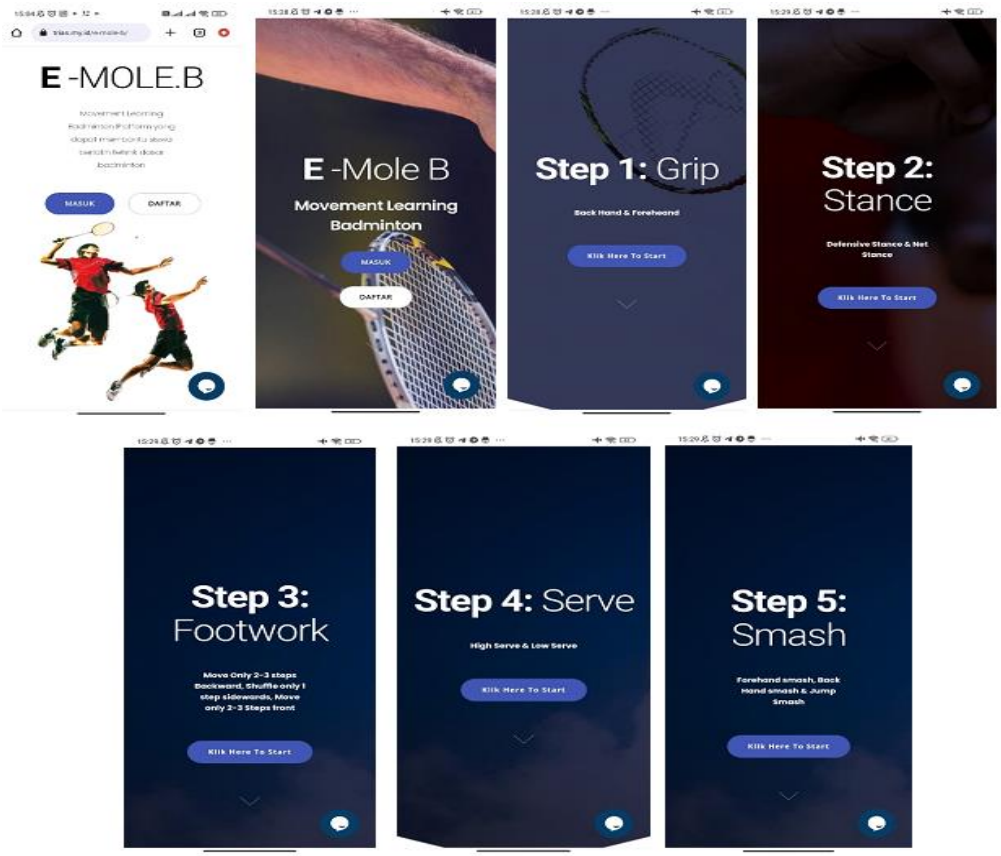

Figure 5. The e-Mole B application

DISCUSSION

Development of a Badminton Learning Application Based on "e-Mole B."

At the beginning of e-Mole B development, it was designed and produced as an initial product for learning applications for educational badminton games. The development process involves research and development procedures, planning, production, and evaluation. The product is developed with the support of experts in application design. After the initial product is produced, it is evaluated by experts through expert validation and tested on respondents. Media experts carried out the evaluation stage. The next research stage was carried out with one-on-one product, small, and large-group trials.

The "e-Mole B" quality is included in the "Proper" criteria. This statement can be proven by analyzing "Proper" expert assessments and assessing one-on-one, small group, and field trials. Students feel cheerful and enthusiastic to learn badminton using this product. This product can be distributed widely as other training aids.

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CONCLUSION

It can be concluded that developing a badminton learning application based on "e-Mole B" is suitable for badminton learning. Furthermore, applying the "e-Mole B" Based Badminton Learning Application can improve students' fundamental skills. Recommendations for further research to redevelop all activities in physical education subjects so that this mobile learning application can be utilized in physical education learning as a whole

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