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

Boby Agustan¹, Ramdhani Rahman²

¹,²Pendidikan Jasmani Kesehatan dan Rekreasi, STKIP Muhammadiyah Kuningan, Indonesia
email: bobyagustan@upmk.ac.id¹, ramdhani@upmk.ac.id²

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Abstract

The absence of technology-based learning media in badminton activities has motivated researchers to develop new technology-based learning media so that they are easy to use and practice anywhere. This study aimed to develop an electronic-based badminton learning application called "E-Mole B." The method used in this research is research and development or R&D. 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 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 given at all education levels, from elementary to high school (Dewi et al., 2021). The initial stage for mastering badminton techniques is to start with an introduction.

The process of introducing basic techniques can be done 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 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 done 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 because of their mobility and more intuitive operating methods (Reychav & Wu, 2014). Interactive multimedia using Macromedia Flash as learning media is much better than traditional style (Sahayu, 2013). In the 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 have overcome this by moving slowly (Winarno, 2019). However, in this way, there is a difference between the actual movement and the movement made slowly to exemplify 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, one of which can overcome the limitations of space, time, and sensory power, such as movements that are difficult to see and pay attention to through repeated video playback (Khomarudin, 2018; Winarno, 2019). By using learning media, problems when introducing techniques can be resolved. This learning media will function as a solution if we use electronic media to introduce badminton techniques in learning basic badminton techniques (Aripin, 2018).

However, the schools researchers observed still need to use more electronic media as a learning tool (Sharples, 2007). The urgency of this research can be seen from the low use of electronic media when practicing basic badminton techniques. Furthermore, the learning media used is still not effective, so there is a need for a new media, namely "e-Mole B." If we are studying basic badminton techniques, electronic media is used as a
means of introducing 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.

The urgency of this research can be seen from the low use of electronic media when practicing basic badminton techniques. Similarly, the learning media used is still not effective, so there is a need for a new media, namely "e-Mole B." If we are studying basic badminton techniques, electronic media is used as a means of introducing badminton techniques. However, the schools' researchers observed that they still need to use more electronic media as a learning tool. The urgency of this research can be seen from the low use of electronic media during basic badminton technique training. Besides that, the learning media used is still not effective, so there is a need for a new media, namely "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, which first describes the design in prototype form as a functional requirement that the user will approve. (Wibowo Adie & Arifudin, 2016). The location for this research is SDN Cipasung, with 58 grade 4 students. The following is the research flow diagram:

![Figure 1. Research Flow Chart](https://doi.org/10.20884/1.paju.2023.5.1.9664)

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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 obtain data as research study material. This analysis showed that students still had great difficulty working on unusual math problems, better known today as numeration problems, so media that could help and accompany students in learning mathematical numeracy was needed. Therefore, the researcher tries to solve this problem by developing a mobile learning application to help students learn numeracy called "e-Mole B." 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"](https://example.com/figure2.png)
Table 1. Contents of the material "E-Mole B"  

<table>
<thead>
<tr>
<th>No</th>
<th>Basic Badminton Skill</th>
<th>Types</th>
<th>Movement Learning</th>
<th>Student/ Payer (Ceklist)</th>
<th>Teacher (Ceklist) tahapan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Link Youtube Video Samle</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Grip</td>
<td></td>
<td>Teknik backhand grip dapat dilakukan dengan cara menggenggam tangkai raket, lalu memposisikan ibu jari di belakang tangkai dan menekennya seolah-olah ibu jariilah yang menjadi penyokong raket</td>
<td>Back Hand</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fourhand grip menggunakan jari telunjuk, tengah, manis, dan kelingking sebagai penyokongnya. Umumnya, Teknik ini digunakan untuk gerakan permainan yang lincah.</td>
<td>Fourheand</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Stance</td>
<td></td>
<td>Untuk menerapkan posisi bertahan player harus memosisikan badan mengadap net dan memosisikan raket didepan pinggang/ perut.</td>
<td>Defensive Stance</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Net stance biasanya dilakukan Ketika lawanmu tampak ingin melakukan netting. Untuk mengantisipasi netting, player arus berada di dekat net setelah itu raket perlu diposisikan di depan tubuhmu, sementara badan dimajukan sedikit agar siap melakukan lompatan ke depan.</td>
<td>Net Stance</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Footwork</td>
<td></td>
<td>Bergerak 2-3 langkah ke belakang</td>
<td>Move only 2-3 steps backwork</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Bergerak 1 langkah</td>
<td>Shuffle</td>
<td></td>
</tr>
</tbody>
</table>

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3. Application Evaluation and Revision

The application created will then be validated by material experts, media experts, and potential users, in this case, students, to get feedback. The feedback obtained is used 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, and a MySQL database supports it because the application will be based on a web application.

5. **Testing**

After the application is made at the developing stage, testing is carried out at the system level, small-scale user level, and large-scale user level. At the system level, testing is done by testing the functionality of whether the application is functioning properly. Furthermore, at the small-scale testing stage, it is carried out by asking several users to use the application to be asked for feedback, or in other words, 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. This "e-Mole B" Based Badminton Learning Application development product 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, namely an application media expert. The application media expert who became the validator in this development research was 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

<table>
<thead>
<tr>
<th>No</th>
<th>Statement</th>
<th>Evaluation</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Design Aspect</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A. Contents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Size</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Design arrangement</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Color and display</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. Writing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>The size of the writing on the guide</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Stylists writing guides</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Color</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Basic application color</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Example implementation guide</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td></td>
<td>III Usage Aspect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Provides user effectiveness</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Learning is more effective and efficient.</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Assist teachers in implementing learning.</td>
<td>√</td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>No</th>
<th>Rated aspect</th>
<th>Earned Score</th>
<th>Maximum Score</th>
<th>Percentage(%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Application design</td>
<td>30</td>
<td>40</td>
<td>75%</td>
<td>Pretty decent</td>
</tr>
</tbody>
</table>

Based on the data obtained, it can be concluded that the Badminton Learning Application Based on “e-Mole B” can be categorized as "quite feasible" 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 Ciawigebang, and the trial was conducted in 1 meeting. The conditions during the small group trial as a whole can be 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>
<thead>
<tr>
<th>No.</th>
<th>Rated aspect</th>
<th>Average Score Obtained</th>
<th>Maximum Score</th>
<th>Percentage (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Application design</td>
<td>34</td>
<td>40</td>
<td>85%</td>
<td>Worthy</td>
</tr>
</tbody>
</table>

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 "Fine," 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 as a whole can be 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 smoothly, 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

<table>
<thead>
<tr>
<th>No.</th>
<th>Rated aspect</th>
<th>Average Score Obtained</th>
<th>Maximum Score</th>
<th>Percentage (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Application design</td>
<td>35</td>
<td>40</td>
<td>87.50</td>
<td>Worthy</td>
</tr>
</tbody>
</table>

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 "Decent."

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

At the beginning of the development of e-Mole B, it was designed and produced as an initial product in the form of a learning application used for educational badminton games. The development process involves research and development procedures, planning, production, and evaluation. Then, the product is developed with the help of someone who has mastered application creation. After the initial product is produced, it
needs to be 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 trials, small group trials, and field trials.

"e-Mole B" quality is included in the "Decent" criteria. This statement can be proven by analyzing "Decent" assessments from experts and assessing one-on-one, small group, and field trials. Students feel happy and enthusiastic about this product because respondents are interested in trying to operationalize it; this product can be distributed widely as other training aids.

CONCLUSION

It can be concluded that developing a badminton learning application based on "e-Mole B" can be said to be 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 used in physical education learning as a whole

REFERENCE


Hung, H.-C., Young, S. S.-C., & Lin, C.-P. (2013). No student left behind: A collaborative and competitive game-based learning environment to reduce the achievement gap of


