Development of Microsoft Power Point Interactive Media Based on Visual Basic for Application as Middle School Science Learning Media

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Abstract. Learning systems in the 21st century require a variety of interactive learning media. The purpose of this study is to develop an interactive microsoft power point media based on visual basic for application on vibration, wave, and sound material. This study method is a type of research and development (R&D) using the ADDIE development model which consists of analysis, design, development, implementation, and evaluation stages. The population in this study at the field trial stage were all students of class VIII SMPN 1 Logas Tanah Darat. The sampling technique for this study used purposive sampling, namely determining the sample according to research needs. The research sample at the field trial stage consisted of 28 students. The data collection technique in this study was in the form of distributing questionnaires and administering tests. The validation data analysis technique uses the Aiken V validity index formula, while the analysis of practicality and effectiveness test data uses the average formula. The results of this study indicate that the results of the overall validity test index get an Aiken V validity of 0.86 with a high validity category. In addition, the results of the practical test analysis reached 83.25% in the very practical category. The results of the analysis of effectiveness get the proportion of 82.14% so that the developed media is effective. Thus it can be concluded that the microsoft power point interactive media based on visual basic for application developed are valid, practical and effective.

Keywords: interactive media, microsoft power point, visual basic for application.

Introduction

The growth of increasingly sophisticated technology, humans must be able to adapt to today's sophistication. This technological sophistication has not only penetrated society but also the world of education (Andryansah et al., 2021). Currently, the use of information and communication technology is a requirement that must be met in order to create a reliable and globally competitive generation (Soimah, 2018). The presence of technology helps teachers and students to facilitate learning activities, especially as intermediaries for messages in learning or commonly referred to as learning media (Bungawati & Rahmadani, 2023).

The low quality of education is reflected in the low student learning outcomes. However, in reality, science learning outcomes are still low, both qualitatively and
This is evidenced by the results of the 2018 PISA which recorded a decrease in the scientific literacy score in Indonesia from 403 to 396 (OECD, 2019). Learning success is determined and influenced by students and the media learning used by the teacher in the classroom. Lack of use of learning media in activities learning can cause learning to become monotonous, and uninteresting and eventually affect student learning outcomes (Wafiq et al., 2021).

Physics material is material that is difficult for students to understand, especially material that contains calculations such as vibration, wave, and sound material. This is supported by the results of a study by Pratiwi et al., (2022) it was found that students had difficulty working on vibration, wave, and sound material questions. Teachers also have difficulty visualizing vibration, wave, and sound material, causing problems in giving material to books. This was also combined with the results of interviews with several students, namely they were also less motivated to read teaching materials at school such as textbooks that are usually used for learning.

In addition, the material used is usually in the form of mandatory books published by the ministry of education and culture, so that new material variations do not appear during learning. As a result, students lose interest and do not pay attention to learning, and students cannot understand what is being taught. This problem becomes a major obstacle in learning every year and can cause teachers to package material in such a way that students learn independently and have a good understanding of the material (Rahmawati et al., 2020).

There are problems faced by the teacher when conveying vibration, wave and sound material, so a tool is needed that can visualize and concretize the material already contained in the book. The use of media is very important for teachers to support the process learning because it can increase the attractiveness of students in learning so that the level of understanding can increase (Wulandari et al., 2020). Therefore, learning media need to be developed by the curriculum and the needs of students to create a fun, interesting, learning process, Interactive, and assist students in understanding the material so that learning objectives can be achieved with good (Mulyono et al., 2019). According to Wirangga et al. (2018) states that one of the learning media that can be used as a solution to accommodate student characteristics is interactive media. This interactive media uses a combination of text, graphics, animation, sound and video to make students more active and innovative in the learning process.

One medium that is easy to use and quite familiar to learn is Microsoft Powerpoint. In Microsoft Powerpoint there is an interactive visual basic for application (VBA) menu. The combination of power point and VBA is able to make videos and questions interactively. VBA is a programming language or macro specifically designed for Microsoft Office and is slightly different from the usual Visual Basic (Anomeisa & Ernaningsih, 2020). To determine the feasibility of learning media, it is necessary to pay attention to suitability, accuracy, timeliness, clarity, and screen layout and presentation.

One solution that can be applied to overcome the problems described earlier is the use of learning aids. Learning media helps students understand abstract concepts to be more concrete and understand learning material (Muzanni & Zinnurain, 2018; Namiroh, 2019; Octafiana et al., 2018). Learning media can attract students’ interest and motivation to learn (Husna et al., 2017). Interactive multimedia is a technology-based learning media that can be used as a transformative medium to create an interesting and active learning process (Chan et al., 2019; Mukmin & Primasatya, 2020; Sofwan & Wibowo, 2019). Interactive multimedia is a composition of several media, including text, images, animations, and videos that are packaged into digital files that are used to transmit news broadcasts and collect data, and ultimately interact with each other. Exchange of ideas or broader elements of communication involving users and the media (Maruti, 2016; Rambe & Saragih, 2016; Sintya et al., 2020).
Several studies have shown that the use of interactive multimedia helps students understand the material (Firmansyah et al., 2020). Interactive multimedia is more feasible when used with math content (Aprianty et al., 2021; Dewi & Haryanto, 2019). The benefit of using interactive multimedia is to increase student activity in the learning process. This is because students are directly involved in the process, making learning more interesting and fun, giving students new learning experiences, helping students understand the material, and generating interest in learning motivation. This research aims to develop microsoft powerpoint interactive media based on visual basic for application.

**Methods**

This type of research is research and development (R&D) (Ibrahim et al., 2020). The steps for developing interactive media for microsoft powerpoint based on visual basic for applications refer to the ADDIE model, namely the stages of analysis, design, development, implementation and evaluation (Ernawati et al., 2022; Ratnasari et al., 2020).

Problem analysis, needs analysis, and curriculum analysis complete the analysis phase. Next is the design stage, namely designing the initial design of microsoft powerpoint based on visual basic for applications, and also designing the codes that will be used in interactive media. The development stage is forming the basic plan into a prototype, then validating and revising it based on the validator's comments and ideas. Students are given media trials during the implementation stage to find out whether or not the learning media is appropriate. Based on student responses, an evaluation and revision of the learning material was carried out at the evaluation stage.

In this study used a questionnaire and tests to collect data. In this study, validity analysis, practicality analysis, and effectiveness analysis were used to analyze the data. Based on the findings of data analysis from the lecturer and science teacher learning media validation sheet, the learning media was declared valid. Analyzing the data with research instruments in the form of media validation sheets consisting of aspects of design, pedagogy, content, and techniques. The validation sheet instrument grid is presented as in Table 1.

| Table 1. Validation Sheet Instrument Grid |
|---|---|---|
| No | Aspects | Questions |
| 1 | Design | 1-9 |
| 2 | Pedagogic | 10-19 |
| 3 | Content | 20-28 |
| 4 | Technical | 29-36 |

(source: Nasir, 2017)

Table 2 shows the rating scale used for each validation item, using a Likert scale of 1 to 5.

| Table 2. Assessment of Validation Items |
|---|---|---|
| No | Alternative answer | Score |
| 1 | Strongly agree | 5 |
| 2 | Agree | 4 |
| 3 | Disagree | 3 |
| 4 | Don't agree | 2 |
| 5 | Totally disagree | 1 |

(source: Sugiyono, 2019)
The data from filling out the product validation sheet by the validator is analyzed to determine the level of product validity using the Aiken’s V validity index (Aiken, 1980; Bashooir & Supahar, 2018; Dewi et al., 2020; Ratnasari et al., 2020) each item is calculated using the formula:

\[ V = \frac{\sum s}{n(c-1)} \]  

(1)

Where V is the validity index of Aiken; \( \sum s \) score set by each rater minus the lowest score, n the number of raters; and c the number of categories the rater can choose from.

After obtaining the Aiken V validity index value, then the validity level is categorized based on Table 3.

**Table 3. Product Validity Level**

<table>
<thead>
<tr>
<th>No</th>
<th>Value range</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>( V \leq 0.4 )</td>
<td>Low validity</td>
</tr>
<tr>
<td>2</td>
<td>( 0.4 &gt; V &gt; 0.8 )</td>
<td>Moderate validity</td>
</tr>
<tr>
<td>3</td>
<td>( V \geq 0.8 )</td>
<td>High validity</td>
</tr>
</tbody>
</table>

(source: Ibrahim et al., 2020)

Microsoft powerpoint interactive media based on visual basic for application is declared valid and suitable for use in learning, if the results of the validity analysis meet the high validity category (Dewi et al., 2020; Ibrahim et al., 2020; Susanto & Retnawati, 2016). Then determine the practicality level of the media by using a Likert Scale 1-5 as well, with a grid of student practicality instruments that can be seen in Table 4.

**Table 4. Student Practical Instruments Lattice**

<table>
<thead>
<tr>
<th>No</th>
<th>Aspects</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Content Quality</td>
<td>1-5</td>
</tr>
<tr>
<td>2</td>
<td>Engineering Quality</td>
<td>6-9</td>
</tr>
<tr>
<td>3</td>
<td>Quality of learning</td>
<td>10-13</td>
</tr>
<tr>
<td>4</td>
<td>Efficiency</td>
<td>14-16</td>
</tr>
</tbody>
</table>

(source: Amatullah, 2021)

The practicality value of the media, the researcher analyzed by adding up the values of all the questionnaires divided by the maximum total value of the media practicality questionnaire then multiplied by 100%. Then the level of practicality is categorized based on Table 5.

**Table 5. Product Practicality Level**

<table>
<thead>
<tr>
<th>No</th>
<th>Practicality Level (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>81 – 100</td>
<td>Very Practical</td>
</tr>
<tr>
<td>2</td>
<td>61 – 80</td>
<td>Practical</td>
</tr>
<tr>
<td>3</td>
<td>41 – 60</td>
<td>Enough Practical</td>
</tr>
<tr>
<td>4</td>
<td>21 – 40</td>
<td>Less Practical</td>
</tr>
<tr>
<td>5</td>
<td>0 – 20</td>
<td>Impractical</td>
</tr>
</tbody>
</table>

(source: Yanto, 2019)
Student learning outcomes test determines the effectiveness of learning media. The researcher analyzed using the number of students who passed the KKM divided by the total number of students and then multiplied by 100% (Nasution et al., 2020). Microsoft powerpoint interactive media based on visual basic for application is declared effective if a minimum percentage of completeness reaches 80% and students can achieve a score that is in accordance with the KKM.

Results and Discussion

This research produced a product in the form of microsoft power point interactive media based on visual basic for the application of vibration, wave and sound material. Presentation of vibration, wave and sound content, as well as practice and evaluation questions, is structured in such a way that it is easy for teachers and students to use. The stages of developing this interactive media are as follows.

Analysis Stage
The first step of the analysis phase is problem analysis by observing students at school, it is revealed that students have difficulty solving questions involving vibration, wave, and sound material. In addition, students are less involved when they study. Based on the findings of the needs analysis, educators need learning tools that can encourage student participation. Utilizing computer-based media is one of them. The next step is curriculum analysis to ensure the basic competencies (KD) and core competencies (KI) that need to be developed.

Design Stage
The researcher made the initial design of interactive media at this design stage in the form of a display design with a title page, login page and main menu page. After that, arrange the layout of teaching materials and collect various images to improve the appearance of the media. From the main menu page, the media will be further developed into competency pages, materials, animations, exercises, evaluations, profiles, and instructions. The visual basic for application (VBA) used in this interactive media is already in microsoft powerpoint by activating the developer menu so there is no need to download the visual basic application again.

The developed interactive media contains material on vibrations, waves and sound and has been adapted to KD which are arranged as markers. Students can also work on practice and evaluation questions in this interactive learning media. At the end of each exercise and evaluation question, students can immediately find out the value they got. Researchers also prepared test questions, validation questionnaires, and student response questionnaires as part of this stage.

Development Stage
In his stage, the researcher developed an interactive microsoft powerpoint based media based on visual basic for application by including the necessary components such as pictures and materials. Interactive media display can be seen in Figure 1. Furthermore, programming (coding) is added as shown in Figure 2.
As for some of the parts contained in the developed media will be shown as follows:

a. **Title Page**

The title page is the initial appearance of interactive media which contains the university logo, school logo, material discussed in interactive media, school name, next button and exit button. The initial appearance of the media can be seen in Figure 3.
b. Login Page
The login page display consists of a welcome greeting, please login, username, password, login button, next button and exit button, as shown in Figure 4.

![Figure 4. Login Page Display](image)

Figure 4. Login Page Display

c. Main Menu Page
The main menu page consists of competency buttons, material buttons, animation buttons, practice buttons, evaluation buttons, profile buttons and hint buttons. There is also a home button to return to the main menu page. The main menu page display can be seen in Figure 5.

![Figure 5. Main Menu Page Display](image)

Figure 5. Main Menu Page Display

d. Competency Page
This page contains KI, KD, indicators and learning objectives. On the competency page the home button is used to return to the main menu page. The display of competency pages can be seen in Figure 6.

![Figure 6. Competency Page Display](image)

Figure 6. Competency Page Display
e. Material Page

On the material page there are material selection buttons, namely vibration, waves and sound. There are also back and forward buttons to continue to the next page or return to the previous page. The display of material pages from the media can be seen as Figure 7.

![Figure 7. Material Page Display](image)

f. Animation Page

The animation page contains moving animations about wave vibration and sound material. The animation page display can be seen in Figure 8.

![Figure 8. Animation Page Display](image)

Furthermore, there is a practice page which contains 3 sample questions for each sub-material accompanied by completion answers. Then the evaluation page contains daily test questions in the form of multiple choices of 15 questions. In addition, evaluation questions in interactive media can be done by students and at the end of completing the problem, students can see the scores obtained directly. Then there is a profile page which contains photos and biographical data for making learning media. Finally, there is an instructions page which contains instructions for using Microsoft Powerpoint media based on Visual Basic for Applications.

The next step is to validate the media that was developed before 2 science education lecturers at the University of Riau and 1 science teacher at SMPN 1 Logas Tanah Darat. In addition, revisions were made according to the comments and ideas provided by the validator. After the validation process is complete, which results in the media being deemed fit for use, the questionnaire filled out by the validator becomes the basis for validation data analysis. The results of the validation data analysis are presented in Table 6.
Table 6. Results of the Validity of Microsoft Power Point Media based VBA

<table>
<thead>
<tr>
<th>Aspects</th>
<th>Questions</th>
<th>Aiken's Index</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>1-9</td>
<td>0.85</td>
<td>High validity</td>
</tr>
<tr>
<td>Pedagogic</td>
<td>10-19</td>
<td>0.89</td>
<td>High validity</td>
</tr>
<tr>
<td>Content</td>
<td>20-28</td>
<td>0.84</td>
<td>High validity</td>
</tr>
<tr>
<td>Technical</td>
<td>29-36</td>
<td>0.83</td>
<td>High validity</td>
</tr>
</tbody>
</table>

The results of the overall validity of the interactive media microsoft powerpoint based on visual basic for application are valid with the Aiken V validity index of 0.86, placing it in the high validity category. This is in line with the theory put forward by Anomeisa & Ermaningsih (2020) which states that the PowerPoint media developed meets competency and content standards for the use of technology, so it is valid and appropriate for education. This interactive media is made as attractive as possible by combining text, images and videos. Also equipped with quizzes and navigation buttons that students can use directly to help them learn on their own (Sajeev et al., 2021; Wulandari & Nana, 2021). Students more easily understand learning by combining learning media components, such as printed teaching materials, images, audio, and video (Havizul, 2019; Nuraini et al., 2021).

The advantages of the interactive media developed are illustrated with examples and animations, including material on vibrations, waves and sound. Through the pictures presented, the goal is for students to gain contextual understanding. According to Havizul (2019), good learning media is presenting content interactively and visually, allowing students to see abstract subtopics concretely. In addition, practice questions are included in the media to measure students' understanding of the material.

The contents of the material in interactive media are arranged according to the K-13 syllabus, basic competency (KD), and instructions according to the learning objectives. The link between KD, indicators, learning objectives, and the suitability of evaluation with learning objectives can facilitate students and teachers in the learning process. So that learning objectives can be achieved properly (Dwiqi et al., 2020; Siddiq et al., 2020). This is consistent with previous research which found that in making learning media, it is very important to consider the appropriateness of learning objectives, indicators, basic competencies, and learning materials that students want to achieve (Dewi & Negara, 2021; Geni et al., 2020).

Students will learn more easily when interactive media is used in learning activities because it can be used according to student preferences. Through interactive media students can study independently at any time and from any location (Elwi et al., 2017; Gama et al., 2016; Kurniawati & Nita, 2018).

Implementation Stage

At this stage, trials were carried out in class VIII A. After students learned using interactive media microsoft powerpoint based on visual basic for applications on vibration, waves and sound material, each student was given a student response questionnaire about how to use interactive media in study activities. The results of the student response questionnaire data analysis can be seen in Table 7.
Table 7. Results of Student Response Data Analysis

<table>
<thead>
<tr>
<th>Aspects</th>
<th>Questions</th>
<th>Practicality Level (%)</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content Quality</td>
<td>1-5</td>
<td>77.60</td>
<td>Practical</td>
</tr>
<tr>
<td>Engineering Quality</td>
<td>6-9</td>
<td>90.50</td>
<td>Very Practical</td>
</tr>
<tr>
<td>Quality of learning</td>
<td>10-13</td>
<td>82.50</td>
<td>Very Practical</td>
</tr>
<tr>
<td>Efficiency</td>
<td>14-16</td>
<td>84.00</td>
<td>Very Practical</td>
</tr>
</tbody>
</table>

Based on the results of the analysis of student responses with an achievement score of 666 and a total of 10 students, an average percentage of 83.25 was obtained. In accordance with the practicality criteria, if the average score of the percentage of student responses is > 80%, the interactive media developed is in the very practical criteria. Therefore, microsoft powerpoint interactive media based on visual basic for applications on vibration, wave and sound material is declared practical. This is in line with the results of research conducted by Damayanti & Qohar (2019) which stated that microsoft powerpoint learning media based on visual basic for applications can foster students’ passion for learning and make it easier for students to use it.

Between indicators, basic competencies, learning objectives, and material that are interrelated and evaluation with appropriate learning objectives can expedite learning activities so that they are able to increase students' knowledge (Dwiqi et al., 2020). In line with research (Hariyono & Darnoto, 2018) which states that mastery of learning media is a tool that can stimulate students to study so that the acquisition of knowledge in learning goes well.

Students are very enthusiastic in using learning media, because the appearance of the media is attractive and easy to operate, the text is read clearly, the selection of compositions and color combinations is right, besides that the media is supported by appropriate musical accompaniment so that microsoft powerpoint interactive media is based on visual basic for application can help students understand the material, and interactive media can increase student motivation in observing subject matter (Nurrita, 2018).

Using instructional media can help students and teachers understand concepts that have been systematically arranged (Darung et al., 2020). Selection of appropriate textual, animated, audio and video content can attract students' interest in acquiring knowledge and can increase the knowledge of students themselves (Khusniati, 2012). This microsoft powerpoint learning media can be used by students anytime and anywhere because this media is practical and does not require an internet connection. From the trial it can be concluded that microsoft powerpoint interactive media is feasible to use during the learning system. According to (Mansur & Rafiudin, 2020) states that the learning process will take place effectively and efficiently by using learning media.

When the learning media has been declared valid and practical, then field trials are carried out. Carry out field trials in class VIII B as many as 28 people to find out the effectiveness of the interactive media developed. After the learning process takes place using interactive media, students are asked to complete questions regarding vibration, wave and sound material. Then assess the learning outcomes and the number of students who score ≥ 68 (pass minimum completeness criteria (KKM).

The results of the analysis showed that 23 of the 28 students who passed the KKM got a completeness percentage of 82.14%. So, microsoft powerpoint interactive media based on visual basic for application on wave and sound vibration material is declared effective. This is in accordance with the results of research (Rahman & Mahmud, 2018).
that power point learning media can increase students' learning activities in participating in learning activities.

The use of microsoft powerpoint interactive media based on visual basic for applications in learning can improve student learning outcomes because by using this media, students can more easily understand the material. This is in accordance with the results of research (Chotimah et al., 2018) that there are differences in student learning outcomes, namely learning outcomes using microsoft power point media based on visual basic for applications are better than classes that carry out ordinary learning. This is also in accordance with research (Nasution et al., 2020) that student learning outcomes increase after using learning media based on visual basic for application. This is also in line with the opinion (Octaviani, 2021) that microsoft powerpoint media based on visual basic for applications is easy for students to operate so that it can encourage students to be active and independent in learning activities with their own pattern and speed so as to improve learning outcomes learners.

**Evaluation Stage**

Based on the results of the development of microsoft power point interactive media based on visual basic for applications on vibration, wave and sound material, it was declared valid, practical and effective. This is consistent with the results of research according to (Faruq et al., 2018), namely the results of the development of microsoft powerpoint learning media based on visual basic for applications on arithmetic sequence material are declared valid, practical and effective. These results are supported by research which states that the developed microsoft powerpoint media is very suitable for use by students in learning science (Zulfadewina et al., 2020). Likewise with research which states that in the learning process microsoft powerpoint media is feasible to use and can improve student learning achievement (Fuad, 2019).

The advantages that exist from interactive media that are developed are displaying a variety of interesting features that can make students more enthusiastic about learning and make it easy for teachers in learning to convey material using these media. In addition, there is also research which states that the use of microsoft power point learning media can increase students' cognitive knowledge because there are pictures and sound shots that can be combined in microsoft power point (Anggara, 2019). There is also the same research which states that the results of the research show that the assessment of various aspects is in a proper category to be used as a learning medium (Sudarto et al., 2019).

**Conclusion**

Based on the results of this research, it can be concluded that the microsoft powerpoint interactive media based on visual basic for applications on vibration, waves, and sound material for class VIII students is valid with an overall Aiken V validity index of 0.86. The results of students' practicality of using interactive media reached an average of 83.25%, which means that microsoft powerpoint interactive media based on visual basic for applications can be said to be practical. Student learning outcomes after using this interactive media reached a level of completeness (student scores ≥ 68 points) of 82.14%, so that the microsoft powerpoint interactive media based on visual basic for applications was considered effective. Thus it can be concluded that the microsoft power point interactive media based on visual basic for application vibration, wave and sound materials produced and developed are valid, practical and effective so that they are suitable for use in learning.
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