Utilization of Microsoft Power Point Applications as Physics Learning Media Interactive on Diode Material

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Abstract

This study aims to provide new innovations in the use of Microsoft Power Point applications as interactive physics learning media on diode material. In addition, it motivates physics teachers to use technology in the implementation of learning in class. The target of this research is in the form of products resulting from the use of the Microsoft PowerPoint application as an interactive physics learning medium on diode material. This research method is research and development using a development model consisting of five stages, namely: (1) preliminary investigation; (2) design (3) realization/construction (realization/construction); (4) test, evaluation, and revision (test, evaluation, and revision); (5) implementation (implementation). The results of this study are the creation of interactive physics learning media through power point applications with the plomp model known as 5 stages, namely the initial investigation stage, design, realization/construction, test evaluation and revision and implementation. Power point interactive learning media is generally declared feasible to use after going through several trials carried out with material expert tests, media expert tests by looking at the results of the assessment of the two validators with a value obtained of 77.50 including the valid category for material experts and media experts obtaining a score of 78.46 is included in the valid category. It can also be seen that the effectiveness of learning media through the ability of student learning outcomes with a pretest score of 64.00 and a posttest score of 84.00 shows a significant increase in student learning outcomes.

Keywords: microsoft power point; learning media; studying physics; interactive

INTRODUCTION

Education in general aims to help people discover the nature of their humanity. With education, it is hoped that humans will be able to realize their potential as thinking beings. One of the government's general policies to build education is to improve the quality of education. Therefore, the importance of education in the millennial era based on the industrial revolution 4.0 requires all students to understand and develop their potential to the fullest (Asy'ari & da Rosa, 2022), so that students can increase their interests and talents and develop the creativity of students in innovation.

Programs for developing the utilization of communication and information technology in accordance with the direction of education policy occur in the development of learning systems and models, development of instructional media programs and development of non-learning educational media programs. The development of the media program is intended to produce learning media by utilizing information and communication technology in order to improve the quality of education and educational equity (Verawati et.al., 2022). One of the

main activities carried out online is the development of YouTube channel-based media for learning (Ute, N., Abdin, A., Naim, N., & Kasman, K., 2021).

The development of science and technology is increasingly encouraging renewal efforts in the use of technological results in the learning process. Teachers are required to be able to use the tools that can be provided by the school, and it is possible that these tools are in accordance with the developments and demands of the times. Teachers can at least use cheap and efficient tools which, although simple and unpretentious, are mandatory in an effort to achieve the expected teaching goals. However, during the learning process, the teacher only uses learning media in the form of books according to the field provided by the government and uses simple pictures so that students find it difficult to understand learning material, it is easier to feel bored and causes students to be inactive when learning activities take place. The lack of achievement in learning is caused by the learning process that does not run optimally (Dewi & Izzati, 2020). To overcome these problems, teachers should be able to develop active and innovative learning media in the learning process (Putri Nasution & Siregar, 2018).

The polemic that is currently happening at SMK Negeri 6 Kendari is very concerning about the process of learning activities, where the problems that have occurred so far are still using one-way media such as blackboards. Teachers still dominantly use the lecture method to present learning material in front of the class, students take notes and listen, so that when students are given the opportunity to ask questions, most of them do not take that opportunity, this is probably because students do not know what they are going to ask, because they did not understand the material given. This method is in fact not efficient in the implementation of teaching and learning. Similar problems were also conveyed (Illahi et al., 2018) who found that the learning process for students was difficult in understanding learning material due to the lack of use of media as a learning resource. Furthermore (Putria et al., 2020) states that from factors students also encounter obstacles in online learning. Students feel bored and bored while carrying out learning. This condition also causes the mastery of subject matter to decrease (Rahmawati, 2020).

Observing the conditions of the learning outcomes above, it is necessary to carry out a learning innovation so that the achievement of student learning outcomes becomes better and more effective. One of these learning innovations is the use of the Microsoft PowerPoint application as an interactive physics learning medium on diode material. In addition to the Microsoft PowerPoint application used as a medium in learning, there are also many other applications that support it, such as the Macromedia Flash application. In general, the Macromedia Flash application is also a form of learning media that can provide stimulus and feasibility for the learning process of students. The implementation of the development of learning media based on the Macromedia Flash application is very effective, centralized and focused on being used in the learning process (Abdin et al. 2020). However, in this study, it discusses the use of the Microsoft PowerPoint application as an interactive physics learning medium. This type of learning process makes it possible to access information flexibly without being limited by time and place. One characteristic that appears in independent learning. Students are required to be more able to manage the entire learning process themselves, including managing their own environment, motivating, increasing knowledge independently, proactively and thoughtfully so that they are able to solve problems independently as well. Therefore, teachers must be able to choose and design the right learning media (Nurseto, 2011). One of the media that can be used in online learning is interactive learning media in the form of power point. Interactive learning media is effective in increasing mastery of concepts (Novita & Harahap, 2020) and is able to increase student enthusiasm (Putri & Sibuea, 2014) because student responses to interactive power point media are very good (Warkintin & Mulyadi, 2019); (Havizul, 2020).

The Microsoft Power Point application can be a sophisticated supporting tool that helps educational institution stakeholders meet the demand for strong multiliteracy skills and

development for students. Also through the Microsoft Power Point application, teachers can motivate students to share their ideas and solve various problems for the benefit of them or the educational institution community. The use of the Microsoft PowerPoint application is an appropriate technology-based learning, because the teacher acts as a collaborator and facilitator in learning, the teacher is not one of the learning resources. This change indicates that a teacher is increasing his competence in order to become a professional teacher.

The objectives of this research are (a) to describe how to make interactive physics learning media through power point applications. (b) describe the feasibility of the results of using the Microsoft Power Point application as an interactive physics learning medium on diode material. (c) describe the effectiveness of learning media with power point for physics learning that is made.

METHOD

In this research, research and development (R & D) is a research method used to produce certain products and test the effectiveness of these products (Sugiyono, 2018). Utilization of the Microsoft Power Point application as an interactive physics learning medium is a process of learning activities in general. In utilizing this research using the Plomp development model (Plomp T,et al (2013). This model consists of five stages, namely: (1) preliminary investigation, (2) design, (3) realization/construction, (4) test, evaluation, and revision (test, evaluation, and revision), (5) implementation (implementation).

The initial stage before designing the product is analysis. The analysis carried out includes (1) analysis of problems and needs, (2) analysis of curriculum and competencies, (3) analysis of student characteristics, (4) analysis of learning media and learning resources. Analysis of problems and needs is carried out by means of a literature study in order to obtain solutions to the problems and issues found.

The next stage is design. At this stage the researcher has made the initial product (prototype) or product design. The first step in designing power point-based interactive learning media is learning materials. The second step is to design the initial product for power point-based interactive learning media which consists of home features and the main menu. The main menu consists of KD, objectives, materials, summaries and quiz questions. This development research was carried out at the Computational Physics Laboratory FKIP Halu Oleo University, implemented to students at SMK Negeri 6 Kendari with the subject matter of diode odd semester of the 2022/2023 academic year.

The data collection tool techniques used in this study include: a) data about the validity of learning media was taken using a validation instrument sheet. b) data on the effectiveness of physics learning abilities were taken by testing students' learning abilities.

Criteria for the validity and effectiveness of the Microsoft Power Point application as an interactive physics learning media are described as follows:

Validation questionnaire analysis

This validation questionnaire analysis is used to see the feasibility of the media made. Data in the form of feasibility assessments on product trials from questionnaires were analyzed using the Likert scale with the scoring rules in the following Table 1.

Table 1. Likert scale (Akbar, 2013)

Category	Score
Very valid	5
Valid	4
Pretty valid	3
Less valid	2
Very invalid	1

In this study using a scale of 1 to 5 with the highest score of 5 and the lowest score of 1. The percentage of the validation result score is obtained by the formula:

$$V = \frac{T}{U} x100\%$$

Information:
V = Validation
T = Validity Score obtained
U = Maximum score of Validity

The value of the eligibility category is:

Table 2. Score percentage scale

Criteria	Intervals
Very invalid	$0 \leq X \leq 20\%$
Less valid	$21\% \leq X \leq 40\%$
Pretty valid	$41\% \leq X \leq 60\%$
Valid	$61\% \leq X \leq 80\%$
Very valid	$81\% \leq X \leq 100\%$

(Akbar, 2013)

Analysis of participant learning outcomes

Determining the value of participant learning outcomes, the range of values used for objective tests in this study is 0-100 with the formula:

$$X_i = \frac{Sp_i}{Sm} x100\%$$

Information:
Xi = the value obtained by the i-th participant
Spi = score obtained by participant i
Sm = maximum possible score (ideal score)

To categorize the value of student learning outcomes, by following the categorization rules as follows.

Table 3. Categorization of learning outcomes (Fitri, Mawardi, & Kurniawan, 2017)

Value intervals	Category
0 – 40	Fail
41 – 55	Not enough
56 – 65	Enough
66 – 80	Well
81 – 100	Very well

RESULTS AND DISCUSSION

The results of this study are in the form of interactive PowerPoint learning media product designs with diode material for class XI-TPTL at SMK Negeri 6 Kendari. The type of development model used in this research is the Plomp development model (Plomp T,et al (2013). which includes (a) the preliminary investigation stage; (b) the design stage; (3) the stage of realization/construction (realization/construction); (4) the test, evaluation and

revision stage (test, evaluation and revision); and (5) the implementation stage (implementation).

Initial investigation stage (preliminary investigation)

At this initial investigative stage setting lesson objectives, the activity of setting learning objectives is carried out to focus the resulting product development towards learning needed by the school. However, products in the form of interactive learning media are learning media that are capable of supporting learning activities with an attractive appearance containing interaction or involvement of teachers and students as users so that they can help enthusiastic students understand teaching material (Afifah et al., 2022; Hodiyanto et al., 2020). Through initial observations with the homeroom teacher of class XI at SMK Negeri 6 Kendari, it was stated that during the learning activities the teachers delivered the learning material well, but there were obstacles such as material which was difficult to explain, making it difficult for students to understand the learning material. Next determines the theme and scope of interactive powerpoint media, the researcher determines the development of interactive PowerPoint form learning media which includes diode material. Developing prerequisite skills is carried out to ensure that students have abilities related to how to operate interactive PowerPoint learning media for students at SMK Negeri 6 Kendari, in online (online) and offline (offline) learning situations. Based on the results of observations made at SMK Negeri 6 Kendari, most students already have mobile phones that can support the operation of this interactive PowerPoint learning media at their respective homes.

Design stage (design)

The first process is passed by creating an outline content. The content in question is basic competence, indicators, materials, summaries and quizzes. For this reason, teachers must be able to be creative in creating innovations optimally related to the use of media and aids in learning while still adjusting the characteristics of students' educational levels so that the learning material provided later will be easily digested by students (Mishra et al., 2020; Sastra Agustika et al., 2017). The material used is the subject matter of diodes in electricity subjects. The design stage is carried out by compiling flowcharts, layouts/views, and storyboards. To assess the product that has been made is done by providing instruments used to determine the validity of the product being developed. Questionnaires for validity testing were administered to: (1) learning material experts, (2) learning media experts, and (3) individual trials. In the learning process activities it is necessary to compile a lesson plan, by compiling this lesson plan the learning steps are systematically arranged.

Realization/construction stage (realization/construction)

At this stage the product that has been designed and designed will be developed into a real product according to the flowchart and storyboard. The development stage is carried out by developing products according to the designs and storyboards that have been previously designed. Production of components from interactive PowerPoint learning media which include text, animation, audio, and video. But in other interactive learning media using the articulate storyline 3 application, where this application can create content in the form of a combination of text, images, sound, animation and video (Setyaningsih et al., 2020). It also includes combining these elements into integrated parts. In making this product using the powerpoint application which is the main program in making the product, and converted into ppsm form so that when the file is opened it goes directly to the presentation without opening the powerpoint editor itself. Selection of text, animation, audio, adjusted to the needs of the material and learning objectives as outlined in the learning media. This stage is the realization or construction of the product design stage. The visual appearance of powerpoint media products is as follows:

Figure 1. Intro View

Figure 1 displays the intro or waiting (loading) process by bringing up the subject title that will be discussed in interactive power point learning media. Then it can display the home menu with several options to enter the main menu page, as shown below.
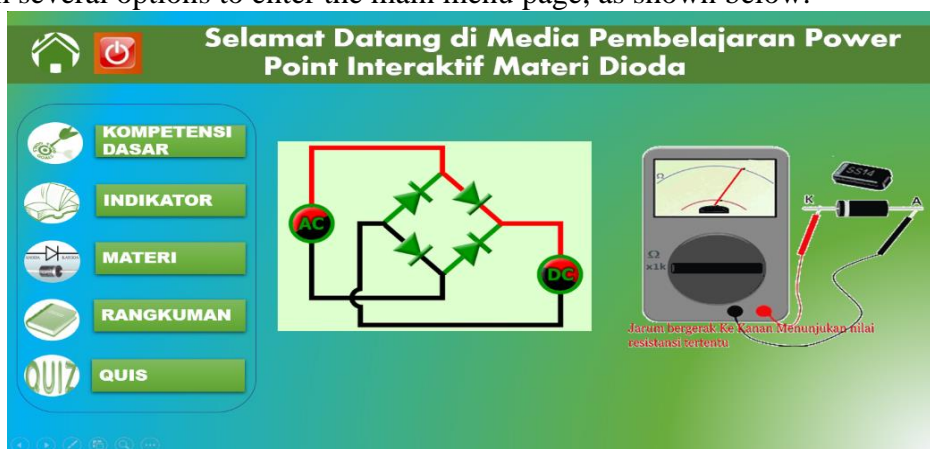

Figure 2. Home menu display

Figure 2 is the display of the front page (home menu) which contains the media page in the upper left corner, the title of the learning material, basic competencies, indicators, materials, summaries, quizzes and if you leave home, click the exit feature from the menu in the uppermost left corner. If you continue, start by clicking on the basic competency menu, then it can be seen as shown in Figure 3 below.

Figure 3. Basic competency display

Figure 3 is a display of competency standards or basic competencies containing understanding diode circuit applications and using diode circuit applications.

Figure 4. Indicator menu display

Figure 4 is a display of the learning indicator menu containing understanding diode circuit applications and using diode circuit applications. The content of the learning indicators is that there are 6 indicators consisting of; (1) explain the definition of a diode, (2) explain the function of a diode, (3) explain the symbol of a diode (4) mention the type of diode, (5) explain the characteristics of a diode, (6) explain how a diode works.

Figure 5. Material menu display

Figure 5 displays a menu of learning materials containing understanding the material or subject matter about diodes. In the content of learning material consists of; definition of diode, function of diode, symbol of diode, type of diode, characteristics of diode, how diode works.

Figure 6. Display of the summary menu

Figure 6 displays the diode material summary menu, but the content of the summary or summary above explains in general or thoroughly the material that has been displayed in the diode material menu.

Figure 7. Quiz menu display

Figure 7 displays the Quiz menu displaying instructions for using Quiz that must be understood by students (students) in taking the quiz test. Instructions for Quiz questions that must be understood by students include; (1) the form of questions in multiple choice consists of 10 questions with 4 options, namely options A, B, C, and D, (2) choose the answer that you think is correct by clicking on the question option, (3) cooperation is not allowed in answering questions, therefore the participants answered with great care in answering the questions and the answers that had been selected could not be repeated.

Figure 8. Display of value scores

Figure 8 above shows the scores obtained by students in answering Quiz questions. At this stage it can also provide information that the number of correct answers is multiplied by 10, the highest score is 100.

Test, evaluation and revision stage (test, evaluation and revision)

At this stage, evaluating the results of products that have been made in the form of Microsoft Power Point can be changed in the form of the PPSM application. The product can be evaluated in the form of a feasibility test by displaying the media that has been designed for two validators, namely the validator media and the validator material. At this stage evaluate the results of products that have been made from Microsoft Power Point in the form of the PPSM application. Each product can be evaluated in the form of trials in front of the validators starting from the initial display to the final display. After seeing and observing the broadcast of the learning media product, it was immediately distributed to the media and material validators through the instruments provided by each validator.

Each validator chooses an instrument that has been provided through the indicators or aspects being assessed. In this activity the validation of media experts that must be assessed is that there are 3 aspects of the assessor (general appearance, special appearance, and presentation of the media), in each aspect of the assessment there is a descriptor or statement that must be assessed. In general view, the media design is in accordance with the diode

material, the media design is in accordance with the diode concept, the media packaging is in accordance with the integrity of the diode material, the media design is attractive to look at, the media design presents real examples, the media design presents questions. Special aspects, Selection of colors in the media, Selection of unique media, Embraces the integrity of the diode concept. Aspects of media presentation, Media appearance is attractive and easy to carry/or move, Given a media title/description, There is a way of using/maintaining media, Media presentation is able to develop students' learning interest.

In the material expert validation activities that need to be assessed there are 5 aspects of the assessment (relevance, accuracy, completeness of presentation, basic concept of diode material, suitability of presentation with student-centered learning demands). Each aspect has several points that are assessed, especially on relevance aspects such as material relevant to the competencies that students must master, material contained in power points relevant to the competencies that must be mastered, completeness of the material according to the level of student development, material sufficient to meet curriculum demands, illustration of material according to the level of development of students, illustrations of sufficient functional material. Aspects of accuracy that are assessed include material presented in accordance with scientific truth, material presented according to the latest developments, material presented in accordance with everyday life, packaging of material in the media according to a scientific approach. The aspect of the completeness of the presentation that is assessed is as presenting the competencies that students must master. Aspects of the basic concept of diode material are assessed for the suitability of the concept of diode material. And the last aspect is the aspect of the suitability of the presentation with the demands of student-centered learning, which can be assessed especially for encouraging student curiosity, encouraging student interaction, encouraging students to build their own knowledge, and encouraging students to study in groups with diode material.

This finding is reinforced by previous findings which state that interactive learning media is appropriate and valid for use in learning (Eryani, 2021; Kuswanto & Walusfa, 2017). This validation activity aims to determine the extent to which materials and media are developed in the form of products that have been designed. If the designed product has been evaluated through material expert validation and media expert validation, then an analysis of the validation results is carried out and if the designed product is revised, it is immediately revised in accordance with the rules of the manufacturing process in general. The results of trials on products in the form of interactive power point learning media are as follows:

Table 4. Percentage of validation results for the development of interactive power point learning media

No	Product Trials	Results	Criteria
1	Test learning materials	77,50%	Valid
2	Test learning media	78,46%	Valid

Based on the table above, the data is the result of validation carried out by material experts. From the data above it can be obtained a score for all aspects of the assessment, namely 77.50%. This means that learning material experts show valid categories and refer to eligibility criteria descriptively according to (Akbar, 2013). Meanwhile, data validation was carried out by media experts. From the data above it can be obtained an average score for all aspects of the assessment, namely 93.85%. This means that physics learning media experts show valid categories and refer to eligibility criteria descriptively according to (Akbar, 2013). In line with that, according to (Mansur & Rafiudin, 2020) states that learning will run effectively and efficiently when using learning media. These results are supported by research which states that the Microsoft power point-based media developed is very suitable for students to understand science learning (Zulfadewina et al., 2020).

Implementation stage (implementation)

At this stage, the implementation of product results regarding the use of Microsoft Power Point applications as interactive physics learning media for participants or students. This implementation stage was carried out in a quasi-experimental manner with a one group pretest posttest design. Test trials test students through a test (pre-test) before being given treatment and a test (post-test) after being given treatment. At the implementation stage, it was carried out in a quasi-experimental manner with a one group pretest posttest design, with the aim of seeing how far the effectiveness of student learning outcomes (students) was before being given treatment and after treatment. This can be seen from the results of student learning through tests (pre-test and post-test) can be seen in the following table:
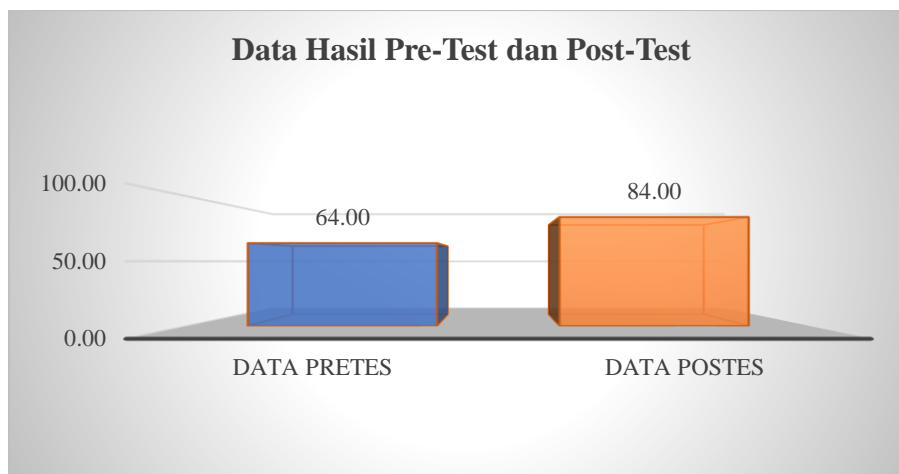

Figure 9. Student pretest and posttest data

Based on table 9 above, it shows that the effectiveness of student or student learning outcomes has increased significantly or there is a significant difference. This can be seen from the average pretest data which is 64.00, while the posttest average result is 84.00.

Based on the results of making interactive learning media consisting of home features and the main menu. Home is the front page of the media that contains the material. The main menu contains Basic Competencies, learning indicators, materials, summaries and evaluation questions (Quiz). The design of interactive power point learning media has the potential to improve students' understanding of physics, especially diode material, because the developed learning media contains learning indicators that have been adapted to predetermined material. Before this interactive power point learning media is implemented, a product test is carried out. This product test is displayed and the product results are displayed before being assessed by the validator. The validators consist of material expert validators and media expert validators who have the competence to assess according to the aspects contained in the material and media validation instruments. If the material and media validators have assessed it, then it can be given a feasible or revised category.

At the development stage, researchers can continue validation with experts and then revise the interactive learning media. After the learning media was declared fit for use after going through several trials carried out by the material expert test, the media expert test by looking at the results of the assessment of the two validators with a score of 77.50 including the valid category on material experts and media experts obtained a score of 78.46 including valid category. These results are supported by research which states that the developed Microsoft power point-based media is very feasible to use for students in understanding science learning (Zulfadewina et al, (2020); (Irfan et al, 2019); (Azhar, R., 2017); (Pramesti et al., 2021). Apart from that, research also states that learning using PowerPoint media is feasible to use and can improve student achievement (Fuad, 2019). Similar research also states that the research results show that the percentage of research results is based on the assessment or validation of material experts on YouTube channel-based learning media

obtained in the valid category and the assessment or validation from media experts is obtained in the valid category. (Ute, N. et al., 2021). In addition, there is also research which states that the use of PowerPoint learning media can improve children's cognitive learning because there are pictures, sounds and voices that are made in the form of PowerPoint (Anggara, 2019); (Mansur & Rafiudin, 2020).

Based on the results of the study that the effectiveness of student learning can be seen through the ability of student learning outcomes with a pretest value of 64.00 because it has not been given treatment and while the posttest value is 84.00 due to the provision of treatment in the form of interactive media so that there is a significant increase in student learning outcomes educate.

CONCLUSION

The making of interactive physics learning media through the power point application went well using the plomp model which is known for its 5 stages, namely the preliminary investigation, design, realization/construction, test evaluation and revision and implementation stages. Interactive power point learning media was generally declared suitable for use after going through several trials carried out by the material expert test, the media expert test by looking at the results of the assessment of the two validators with a value obtained of 77.50 including the valid category on material experts and media experts obtained a score of 78 .46 including valid category. It can also see the effectiveness of learning media through the ability of students' learning outcomes with a pretest score of 64.00 and a posttest score of 84.00 there is a significant increase in student learning outcomes.

RECOMMENDATION

Recommendation To the school, teachers, students so that the results of this research can be used as material for consideration in improving the quality of education, and use it as a reference in developing interactive power point learning media in a sustainable manner.

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