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Interactive Powerpoint Nervous System Material: A Learning Media Development Research

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ABSTRAK

Materi sistem saraf cenderung sulit dipahami serta banyak teori perlu disampaikan dengan ringkas dan menarik. Peneltiian ini bertujuan untuk mengembangkan media pembelajaran berupa powerpoint interaktif pada materi sistem saraf yang dapat meningkatkan hasil belajar. Model penelitian dan pengembangan menggunakan model ADDIE. Metode pengumpulan data menggunakan observasi, wawancara, serta angket. Uji coba kevalidan dilakukan oleh dosen ahli materi dan ahli media. Sedangkan uji kepraktisan dilakukan oleh guru mata pelajaran biologi kelas XI dan 20 siswa. Teknik analisis data yang digunakan yaitu analisis deskriptif kualitatif dan kuantitatif. Hasil penelitian diketahui rata-rata kevalidan powerpoint interaktif masing-masing sebesar 75% dengan kategori valid. Hasil nilai rata-rata kepraktisan powerpoint interaktif secara berurutan sebesar 90% dan 86,85% dengan kategori sangat praktis sebagai media pembelajaran. Kemudian hasil uji t-test diperoleh sig. (2-tailed) sebesar 0,001< 0,05, menunjukkan media pembelajaran powerpoint interaktif efektif dalam meningkatkan hasil belajar siswa.
Kata kunci: Hasil Belajar; Interaktif; Powerpoint.

ABSTRACT

Nervous system material tends to be difficult to understand and many theories need to be conveyed concisely and interestingly. This research aims to develop learning media in the form of interactive powerpoints on nervous system material that can improve learning outcomes. The research and development model uses the ADDIE model. Data collection methods use observation, interviews and questionnaires. Validity trials were carried out by material expert lecturers and media experts. Meanwhile, the practicality test was carried out by the class XI biology subject teacher and 20 students. The data analysis technique used is qualitative and quantitative descriptive analysis. The research results show that the average validity of each interactive PowerPoint is 75% in the valid category. The average practicality value for interactive PowerPoint is respectively 90% and 86.85% in the very practical category as a learning medium. Then the t-test results obtained sig. (2-tailed) of 0.001 < 0.05, indicating that interactive PowerPoint learning media is effective in improving student learning outcomes.
Keywords: *Interactive; Learning outcomes; Power point.*

INTRODUCTION

Interactive Powerpoint is one of the programs in Microsoft Office. Powerpoint or Microsoft Office PowerPoint is "a computer program for presentations". Microsoft Office PowerPoint is an application designed to display multimedia programs. Interactive means two-way communication and also has two-way feedback. Students in the future will actively participate in interactive learning. (Dewi & Manuaba, 2021). PowerPoint can be utilized in several ways to maximize the effect. According to (Rahmawati, 2020) the use of interactive powerpoint media can increase the value of student knowledge in general so as to achieve the learning objectives to be achieved. Compared to using textbooks or other conventional methods, multimedia educational applications such as interactive powerpoints also present concepts that are easy to understand. (Dewi & Manuaba, 2021). In addition, interactive powerpoints are also practical so that the use of interactive powerpoints will make it easier for students to learn on their own. The use of interactive powerpoints can also increase student understanding and improve student learning outcomes. Research conducted by Tristanti and Nafiah proved that there was an increase in learning outcomes. In cycle 1 students who passed 45.45% with an average score of 73.50. In cycle 2 students who obtained 81.82% with an average score of 81.82%, this shows that after the use of interactive powerpoint media there is an increase in student learning outcomes(Tristanti & Nafiah, 2020).

Based on the results of observations that have been made in the form of data collection using a needs questionnaire survey and interviews conducted with teachers at the school, it is known that the teacher is still dominant in explaining the material and using textbooks in his learning which causes less active students in learning activities. Teachers also have time constraints to make other learning media, so the use of learning media is only limited to textbooks. The use of textbooks that contain a lot of writing with few pictures makes it difficult for students to understand the material. So that other learning media are needed that can overcome these problems.

In addition, the results of the questionnaire distribution of learning media development needs by 20 class XII students obtained the results of 53.3% of students answering the learning media that are often used are textbooks. Students prefer learning media that contains complete explanations accompanied by pictures, videos and attractive designs. At the end of the needs questionnaire, learning media development offers were given, namely mindmapp development, LKPD (student worksheet) development, book development and powerpoint development. The results showed that 58% of students chose the development of interactive powerpoint media on nervous system material. In addition, biology teachers also need the development of interesting learning media to support learning activities.

Student learning outcomes can be seen from their behavior, both in the form of mastery of knowledge, thinking skills, and motor skills (Fitriani, 2016). Student learning outcomes on the daily assessment of class XI MIPA SMAN 1 Boyolangu Tulungagung on KD 3.10, especially the nervous system material tends to be lower than other materials, as evidenced by 47% of students who have not reached the Minimum

Completion Criteria (KKM). Student assessments that are still below the KKM indicate that the learning indicators on the material have not been achieved. This is reinforced by the results of the needs questionnaire which shows that 93.3% of students have difficulty learning nervous system material. Students' difficulties are caused by less interesting learning resources, lack of pictures or readings and sentences and words that are difficult to understand. In line with the opinion of (Arisetya et al., 2016) which suggests that the nervous system contains abstract concepts that are difficult for students to understand.

Difficulties in learning nervous system material and limited learning media can certainly affect student learning outcomes. So that appropriate teaching is needed to be able to improve student learning outcomes. The increase in learning outcomes is in accordance with research conducted by Priyanto which proves that student learning outcomes using interactive Powerpoint media during the learning process have been successful (Priyanto, 2022). This study aims to develop an interactive powerpoint learning media on nervous system material that is valid and practical to use and can improve the learning outcomes of grade XI students on nervous system learning material.

METHOD

This type of research is research and development or commonly called research and development (R&D). According to Borg and Gall, what is meant by the research and development mode is "a process used to develop and validate educational products". That research and balancing is an effort to create and verify the efficacy of products used in the teaching and learning process (Purnama, 2013). This research uses the ADDIE development model. The ADDIE model is one of the specific designs in the learning system that emphasizes the basic stages of an easy-to-use system (Cahyadi, 2019). The ADDIE development model will use systematic procedures with the aim of producing the desired product. Five stages will be carried out in the development of this media. The steps of this development model are Analyze (analysis), Design (planning), Development (knowledge), Implementation (implementation), and Evaluation (evaluation/feedback). The purpose of the development model is to design a product that is effective, attractive, and efficient (Cahyadi, 2019).

The analyze stage includes needs analysis, curriculum analysis and material analysis. The design stage is designing the media to be developed in a storyboard. The development stage is the stage of developing the media that has been designed and conducting the media validation stage and improving the media through expert validator suggestions. The implementation stage is the media trial stage which includes practicality testing by teachers and response testing by students and testing learning outcomes using SPSS version 22.0. The evaluation stage is the stage of revising the learning media according to suggestions and input by media experts and learning materials and biology teachers. The research time was conducted on February 24-30, 2023. The place of research was SMAN 1 Boyolangu Tulungagung Tulungagung. The

subjects used are biology subjects with nervous system material.

Data collection methods were obtained through observation, interviews and questionnaires. Observations were made to find out the facilities and infrastructure available at school. In addition to observation, researchers also collected data through interviews with biology teachers. In addition, a questionnaire of learning media development needs was also distributed to 20 students of class XI MIPA 2.

Data collection instruments in this study include; 1) Instruments measuring the validity of learning media in the form of validation questionnaires and will be validated by media experts and material experts; 2) Instruments measuring the practicality of learning media. Collecting data on the validity and practicality of interactive powerpoint media, experts, teachers and students used a Likert scale assessment such as Table 1.

Table 1 Likert Scale Rating Categories

No	Quantitative Analysis	Score
1.	Very good	5
2.	Good	4
3.	Fair	3
4.	less	2
5.	Very poor	1

(Source: Sugiyono, 2017)

The data obtained will be calculated by dividing the score obtained by the maximum score and multiplied by one hundred percent. The formula used is as follows (Indahsari et al., 2018).

$$\text{Value} = \frac{Perolehan\ Skor}{Total\ Skor}\ x\ 100$$

Furthermore, the results of the data from the validation questionnaire obtained by material experts and media experts are assessed for the validity level of interactive powerpoint media as shown in table 2. While the qualification criteria for assessing the level of practicality by subject teachers and students are shown in Table 3.

Table 2. Qualification of Learning Media Validity Level

Percentage (%)	Criteria
84% - 100%	Very valid, can be used without revision
68% - 83%	Valid, can be used without revision
52% - 67%	Moderately valid, can be used but needs minor revision
36% - 51%	Less valid, not used because it needs major revision
20% - 35%	Invalid, cannot be used

(Source: Arifin, 2009)

Table 4. Qualification of Learning Media Practicality Level

Percentage Rate	Category
81-100%	Very practical as learning media
61-80%	Practical as learning media
41-60%	Quite practical as learning media
21-40%	Less practical as learning media

(Source: Arifin, 2009)

Furthermore, to measure the effectiveness of the media is done by assessing student learning outcomes. A total of 2 classes were used for this learning outcome assessment sample. There were 20 students in each class, namely class XI MIPA 2 as the experimental class and class XI MIPA 3 as the control class. The method used in measuring the effectiveness of learning outcomes is the Quasy Experimental method with the research design Nonequivalent Control Group Design. In the research design, before and after treatment (using interactive powerpoint media in the learning process) a test was conducted. A total of 19 test questions in the form of multiple choice were used in the pretest and posttest. Assessment of student learning outcomes using the N-Gain test, prerequisite test and t-test.

RESULTS AND DISCUSSION

Research and development of interactive powerpoint learning media on nervous system material with the ADDIE development model obtained the following results:

Analysis

At this stage, initial analysis and observations were made. Initial observations in the form of school observations, observations of learning activities, and observations of scores on materials that have low learning outcomes. Furthermore, the analysis was carried out in the form of curriculum analysis, material analysis, and needs analysis regarding the need for interactive powerpoint media development of nervous system material. The first step is curriculum analysis and material analysis. The curriculum used by class XI at SMAN 1 Boyolangu Tulungagung is still using the k13 curriculum. In preparing the basis for the preparation of material, the form of assignments and evaluation of learning outcomes must use competency learning indicators (IPK). KD used in the development of interactive powerpoint is KD 3.10 and 4.10, namely the coordination system in which there is a sub chapter of the nervous system. KD 3.10 is further translated into 6 Competency Achievement Indicators.

The nervous system material was chosen based on the results of interviews with biology teachers who suggested that the material tends to be difficult and has low test scores and is below the KKM (Minimum Completeness Criteria). In addition, the results of the needs analysis questionnaire also showed that 93.3% of students found it difficult to learn the nervous system. As many as 86.7% of students suggested that sentences/words were difficult to understand in the nervous system material. This is in line with the opinion of (Arisetya et al., 2016) that the nervous system contains abstract concepts that are difficult for students to understand.

Next is the needs analysis stage of developing interactive powerpoint as a learning media for the nervous system for class XI. An online questionnaire has been distributed through Google form to students of class XII MIPA SMAN 1 Boyolangu Tulungagung Tulungagung. There are 20 students who have filled out the questionnaire. The results of the needs questionnaire show that students know the nervous system material. As many as 93.3% of students find it difficult to learn nervous

system material because many words or sentences are difficult to understand. In addition, learning resources are also a factor in the difficulty of learning nervous system material. Due to the learning resources used in learning, namely package books, so students need other learning resources that can support learning activities. Learning resources that students want are with a complete explanation, presented with videos, presented images and use an attractive design. This is in line with research (Deria & Wardani, 2022) which suggests that the use of interesting videos and animations will easily remind students of learning materials and media.

At the end of the needs questionnaire, learning media development offers were given, namely mindmapp development, LKPD (student worksheet) development, book development and powerpoint development. The results showed that 58% of students chose the development of interactive powerpoint media on nervous system material.

Based on the needs analysis, interactive powerpoint media was developed by including material or subchapters on the nervous system. This nervous system material is closely related to the physiological processes of the human body. The material used is also adapted to real-life problems such as discussions of diseases of the nervous system and the relationship between the nervous system and other systems (sensory system and hormone system). This is in accordance with Hendroanto's opinion who suggests adjusting teaching and learning activities with phenomena in everyday life (Hendroanto, 2018).

Design

In the design stage, the storyboard of powerpoint media is made, color selection and interactive powerpoint content design. The storyboard will facilitate the making of the developed media. The initial design on the storyboard includes the design of the image and animation material in which the material map feature is included. The initial design of the opening of the development product can be seen in Figure 1.

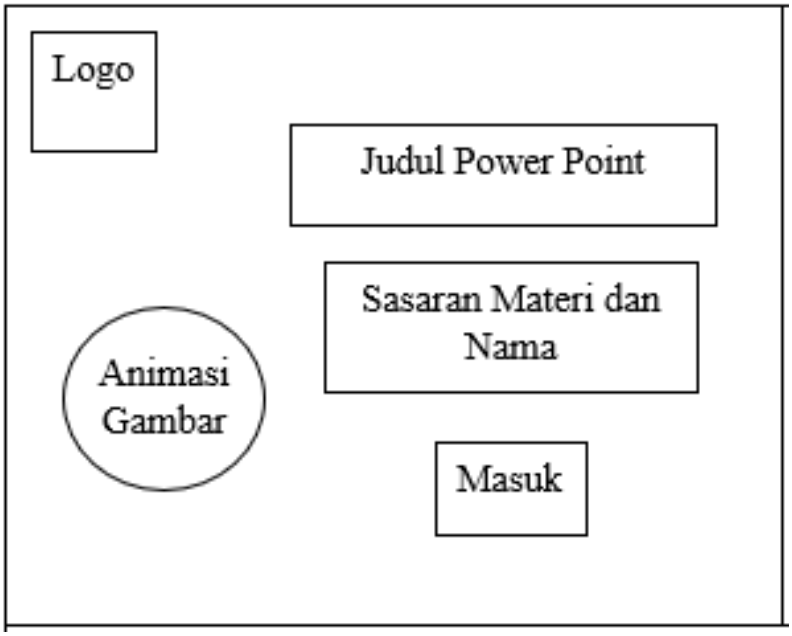


Figure 1. Product Design

The process of making interactive powerpoint learning media on nervous system material is adjusted to the analysis of the needs of students, such as powerpoint there is an explanation; explanations or material on interactive powerpoints are obtained from various high school biology books in accordance with the curriculum used by the school. Interactive powerpoint media accompanied by images; in interactive powerpoint products accompanied by supporting images explaining the material through various sources. Interactive learning media can create effective learning if there is a combination of components such as text, audio, images, video, and animation (Deria & Wardani, 2022).

Interactive powerpoint learning media is made with an attractive design; interactive powerpoint products are made using Microsoft powerpoint 2021. So that interactive powerpoint media can be accessed on various devices as long as they have the Microsoft powerpoint application. The colors used in this interactive powerpoint are pastel blue colors so that they are not too crowded and interfere with vision. The colors used are a combination of blue and light blue as shown in Figure 2.

Figure 2. Color pallet of interactive powerpoint design of nervous system material

The attractive design in this development is made so that students feel excited in learning the material in it. So that the use of interesting learning media will clarify the learning process and can attract students' attention (Deria & Wardani, 2022).

Interactive powerpoint media accompanied by reference videos; the interactive powerpoint is accompanied by a reference video of nervous system material so that it can clarify the explanation of nervous system material. The reference video is obtained from YouTube sources that have interesting explanations and animations. The use of interesting videos and animations on interactive powerpoints can arouse students' memories of the material and learning media (Deria & Wardani, 2022).

Development

At the development stage, product development is carried out in accordance with the design that has been made. Furthermore, the media will be validated by media and material expert lecturers and biology teachers. In the validation process, validators provide an assessment of the developed media and provide input or suggestions for improving development products so that development products are valid for use. The following interactive powerpoint development products have been validated and revised according to the suggestions and input of experts and biology teachers in Table 4. While the results of the validation of material and media experts can be seen in Table 5.

Table 4. Interactive powerpoint media repair menu display

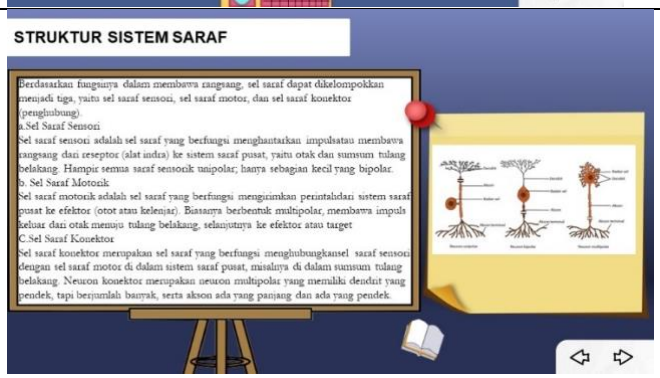
Validator	Section	Media Display	Fixed
Material expert	Tujuan Pembelajaran		Learning objectives are adjusted to the learning materials. Revision of learning objectives
Material expert	Struktur sistem saraf		Before the revision, there was no link between nerve cell type and nerve cell shape. After the revision, there is an additional link between the type of nerve cell and the shape of the nerve cell.
Media expert	Indikator Pembelajaran		before revision the type (font) is different, after revision the type (font) of the letter is equalized
Biology Teacher	Indikator Pembelajaran		before revision the type (font) is different, after revision the type (font) of the letter is equalized Before the revision, there were 6 IPs. After the revision there is an addition to IP 3.10.2.

Table 5. Material and media expert validation results

No	Validator	Validity Results	Description
1.	Material Expert	75%	Valid
2.	Media Expert	75%	Valid

Based on Table 5, the results of media validation by material experts and media experts are known. Validation of material and media experts was carried out by 1 lecturer each Tadris Biology UIN Sayyid Ali Rahmatullah Tulungagung. The validation results show that interactive powerpoint media gets a valid category with a percentage of 75% with some improvements based on suggestions and input by the validator. This product validation aims to determine the validity aspects of the product developed based on the opinion of Kintoko who argues that valid learning media is media that meets the validity criteria according to the validator's assessment with no revision or revision of the development product (Kintoko, 2017). Material expert validators provide suggestions for adjusting learning objectives with learning materials and adding links between nerve cell types and nerve cell shapes. Then the media expert validator gave advice to equalize the font on the learning indicators. the use of the same font will help students remember the material so that the nervous system material will be easier to understand. This is in line with the opinion of (Hilmi, 2017) that the use of interactive learning media is able to concretize the material so that the subject matter, especially the nervous system, will be more easily understood by students.

Implementation

After the interactive powerpoint media is revised, the implementation or media trials will be carried out. The trial was conducted to determine the level of practicality and effectiveness of learning media using student learning outcomes assessment. Interactive powerpoint media will then be tested for practicality by giving a practicality questionnaire to biology teachers and students of class XI MIPA 2 SMAN 1 Boyolangu Tulungagung. The results of the practicality test can be seen in Table 6.

Table 6. Practicality results by teachers and students

No.	Validator	Practical Result	Description
1.	Biology Teacher	90%	Very practical as learning media
2.	20 Students of class XI MIPA 2	86,85%	Very practical as learning media

Based on the results of the teacher's practicality questionnaire in table 6, the average teacher response to the media is 90%. The assessment of the practicality of the media by teachers is seen from 4 aspects, namely the suitability of the material with KI, KD, Indicators and learning objectives, quality aspects, effectiveness aspects, and presentation aspects. This interactively designed learning media can also be utilized by teachers to get feedback from students so that the learning media developed is two-way. So that interactive powerpoint learning media can increase student motivation. Quality learning media is learning media that can motivate students to continue learning so as to create a pleasant learning environment for students. This is in line with research by (Rhamdan et al., 2020) that the use of interactive powerpoint

learning media can facilitate teachers in delivering concrete learning materials to students. Thus, it will make learning motivation increase so that learning objectives can be achieved.

While the practicality test by students consists of 4 aspects, namely software engineering aspects, learning design aspects, technical quality aspects and overall function. Based on Table 6, it is known that the average student response to the media is 86.85% with a very practical category as a learning media. the average student gives a score of 4 and 5 because the media can be accessed anywhere and anytime as a learning media in the classroom and outside the classroom. This is in line with research (Widiana & Rosy, 2021) which suggests that independent teaching materials that can be accessed anywhere and anytime will make it easier for students to think scientifically during the learning process. Furthermore, the media effectiveness test using the learning outcomes assessment was carried out with the N-Gain test, then continued with the prerequisite test and t-test or hypothesis test.

N-Gain testing is used to see the difference in value or difference in value. A total of 20 students in the control class and experimental class were used in measuring the N-Gain value. Each student in the control and experimental classes worked on 19 questions that were valid and reliable. The results of N-Gain testing in the control class obtained a maximum value of 73.27 while in the experimental class the maximum N-Gain value obtained was 100. It can be concluded that the N-Gain value between the experimental and control classes is different. Furthermore, the results of the N-Gain value were tested for prerequisites, namely normality and homogeneity tests. Normality testing uses the Kolmogorov Smirnov test. While testing homogeneity using the Levene Statistic test. After the prerequisite testing, namely normality and homogeneity, is fulfilled, it will be continued with the t-test or hypothesis test to determine the effect of interactive powerpoint on improving student learning outcomes. The data from the normality and homogeneity tests, as well as the t-test can be seen in Table 7.

Table 7. Data from testing results using SPSS 22.0 normality and homogeneity, and t-test.

Normality Testing Results	Normality Testing Results	Results of the t-test
Asymp. Sig. (2-tailed) 0.073	Sig. 0.311	Sig. (2-tailed) 0.001

Based on table 7, the normality value is sig. (2-tailed) 0.073 > 0.05, so the normality of N-Gain learning outcomes is normally distributed. Furthermore, the results of homogeneity testing show the homogeneity value with the levene test obtained sig. 0.311 > 0.05, so it can be concluded that the N-Gain data of learning outcomes are distributed homogeneously or equally. After the prerequisite testing, namely normality and homogeneity, is fulfilled, it will be continued with the t-test or hypothesis test to determine the effect of interactive powerpoint on improving student learning outcomes.

Berdasarkan tabel 7 tersebut diketahui bahwa nilai *sig.(2-tailed)* yaitu 0,001. Maka 0,001< 0,05 sehingga H_1 diterima dan H_0 ditolak. Dengan demikian dapat disimpulkan bahwa media *powerpoint* interaktif efektif dalam meningkatkan hasil belajar siswa kelas XI. Hasil belajar merupakan kemampuan dalam menerima

pengalaman pembelajaran, baik pengalaman pada ranah kognitif, afektif dan psikomotorik (Suarmawan et al., 2019). Improved learning outcomes such as research conducted by (Tristanti & Nafiah, 2020) which proves that there is an increase in learning outcomes in the use of interactive powerpoint media. In cycle 1 students who passed 45.45% with an average score of 73.50. In cycle 2 students who obtained 81.82% with an average score of 81.82%, this shows that after using interactive powerpoint media there is an increase in student learning outcomes.

Based on the explanation above, it is proven that interactive powerpoint learning media on nervous system material can improve student learning outcomes and development products are feasible and valid for use as learning media.

Evaluation

Evaluation is the last stage of the ADDIE development model. The evaluation results obtained suggestions from experts and teachers and revisions have been made to improve the developed media. This interactive powerpoint media has been feasible, valid, and practical as learning media. The results in this study are in line with previous research which reveals that the development of powerpoint-based interactive learning media is feasible to use in the learning process and can increase student learning motivation (Pascha & Radia, 2022). Other research results also reveal that the development of practical interactive powerpoint learning media can improve the learning outcomes of elementary school students (Mumri & Aini, 2019). Selain itu, hasil penelitian oleh (Octaviani, 2017) The results show that the developed powerpoint media is feasible to use as learning media for elementary school students. The development of interactive powerpoint media can be a solution to the use of valid and practical learning media so that it can motivate, improve learning outcomes and increase student enthusiasm in learning

CONCLUSION AND RECOMENDATION

The research that has been done produces interactive powerpoint learning media on nervous system material that can be used for grade XI MIPA students. The interactive powerpoint learning media on nervous system material produced is valid based on the validation of material and media experts who obtained a score of 75%. In addition, interactive powerpoint learning media is also practical as a learning media by obtaining a percentage of practicality by subject teachers and students with a value of 90% and 86.85%. Then based on the t-test obtained sig. (2-tailed) of 0.001 <0.05, which means that interactive powerpoint learning media is effective in improving student learning outcomes. Thus the development of interactive powerpoint media can be a valid and practical learning media and can improve student learning outcomes on nervous system material. Suggestions are expected that the development of interactive powerpoint media can be utilized as learning media widely. In addition, further suggestions from this research need to compare the use of interactive powerpoint learning media with other learning media, so that the research results will be more specific.

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