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Development of Interactive Powerpoint Learning Media to Improve Students' Understanding of Mathematical Concepts Statistics in Class VIII

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Abstract

This research aims to determine the development of interactive Powerpoint learning media to improve students' understanding of mathematical concepts in class VIII statistics material. This type of research is quantitative descriptive research using R&D using the ADDIE model. Subjects were 8 respondents by random sampling. The research instrument is a questionnaire using a Likert scale. Results obtained At the development stage using 3 experts, the results were 87.5% for media experts, 100% for material experts and 90.6% for language experts regarding student concept understanding with an average of 92.7%. The Implementation stage ; 1) The media is easy to use total score of 29 and a percentage of 91% in the Very Appropriate category, 2) The language used is easy to understand total score of 30 and 94% in the Very Appropriate category, 3) Image suitability as many as total score of 29 and 91% in the Very Appropriate category, 4) Interest S Suitability of Images total score of 31 and 97% in the Very Appropriate category, and 5) Understanding the Concept Well total score of 30 and 95% in the Very Eligible category. The overall average is 93.1% with a very decent category.

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1. INTRODUCTION

Education is a system that plays a role in developing human resources. One of the main components of the education system is the teacher. Teachers have the responsibility to develop assignments and address any problems that arise. One way for teachers to overcome problems in the field of education is to implement learning strategies. The education system needs to further develop the use of learning media to support the learning process. helping students understand learning material due to the lack of use of media as a learning resource. Teachers only use books provided by the state as learning media in learning. Learning is not successful because the learning process is not optimal. So it is hoped that teachers can develop active and innovative learning media. Good education, following developments in the future. In accordance with developments in life situations and conditions.

Teaching and learning is a process that processes a number of values to be consumed by each student. There are several types of teaching media that are commonly used in the teaching process. First, graphic media such as pictures, photos, graphs, charts or diagrams, posters, cartoons, comics, etc. Graphic media is often also called two-dimensional media, namely media that has length and width. A conventional learning process without the help of learning media will make students bored of learning, because they don't really understand the explanations, students have difficulty understanding. This is because the human brain is faster at capturing information that comes from moving objects. And people remember things better if they see them, say them and do them [1]. Learning media is a tool for conveying messages in the form of material to students that can help students achieve learning goals. Teachers must be able to choose and design

appropriate learning media. The use of learning media can stimulate new desires and interests, generate motivation, stimulate learning activities, and even have a psychological impact on students [2].

One of the media that can be used in online learning is interactive learning media in the form of power points. Powerpoint is a computer program that can be used for presentations that has been developed by Microsoft in a package with Microsoft Office [3]. There are many types of learning media, one of which is Microsoft PowerPoint-based learning media, which is a presentation application that is popular and most widely used today for various presentation purposes in the learning process. Microsoft PowerPoint has many advantages according to (including being able to display various colors of text and images, can be accompanied by images or videos, the writing process is very simple (if you make a mistake, it can be corrected), the writing mode can be selected according to taste, text, graphics, animation [4] multiple displays, we can also insert sound (songs) to make the presentation more interesting [5]. Interactive learning media is effective in increasing mastery of concepts and is able to increase student enthusiasm because student responses to interactive power point media are very interesting [6].

Interactive learning media can create a learning experience for students like the real life around them because it can make it easier for students to understand the learning material. Interactive learning media has great potential to stimulate students to respond positively to the learning material presented by the teacher. Interactive media-based mathematics learning can also help teachers create a learning atmosphere that is fun, effective, efficient and can also be used by students independently [2] The use of learning media aims to provide stimulation and clarify/simplify the process of receiving and understanding the material being studied. Thus, through interactive learning media it can help and make it easier for students to understand and understand the subject matter presented by the teacher, thereby stimulating them to play an active role in the learning process. [7]. Powerpoint media is one of the media that is quite good to use during learning because it can make students interested and enthusiastic during learning activities, because the nature of Powerpoint media is visual so that students are more enthusiastic during learning activities [8]. The use of Interactive Powerpoint media provides a concrete picture of learning abstract fable texts.

Interactive Powerpoint media can display various menus containing interactive material, quizzes, video images. Interactive is a reciprocal relationship from the message sender to the message recipient [3, 9] So it is hoped that this Interactive Powerpoint media can attract more students' attention and overcome boredom. Learning using Powerpoint media is designed for interactive learning, where the Powerpoint presentation media is designed and equipped with a controller that can be operated by the user so that the user can choose what they want for instructions. usage, materials, and practice questions [10]. Making interactive PowerPoint learning media will be adjusted to student characteristics so that it makes it easier for students to understand learning material with standards for using good learning media, including: 1) Media must convey information according to the purpose and material; 2) Media must be adapted to student needs; and 3) Media must be supported by facilities and infrastructure [11]. Using PowerPoint to provide a learning experience that motivates students, teachers not only want their students to be able to remember the lesson material but also want their students to be able to understand the lesson material comprehensively to increase understanding. The motivation and interest in learning that students gain will last longer. Students have an important role in forming their understanding and increasing their awareness of what they read, write and encounter. The use of media in teaching and learning activities can help generate positive attitudes in students towards subject matter and strengthen the learning process [9]

Mathematics as a compulsory subject. Thinking systematically, critically, logically and creatively are ideas that can be developed with mathematics education. Moreover, students don't like it because mathematics is often thought to be a subject that is not easy. In learning mathematics, of course a teacher has the aim that the learning process carried out can increase students' knowledge, especially in the ability to understand mathematics. Mathematical

understanding is the goal of a mathematics learning process. Mathematical understanding as a goal means the ability to understand concepts, differentiate between a number of mutually exclusive concepts, and the ability to carry out meaningful calculations on broader situations or problems. [12]. Understanding concepts is the result of a person's thinking and ability to develop abstract ideas, grouping objects according to themselves. The importance of students' ability to understand concepts is that students can know, explain, describe, compare, differentiate, classify, give examples and non-examples, conclude and re-express an object in their own language by being aware of the processes it goes through. [13]

Understanding mathematical concepts to understand previous material or prerequisite material in order to understand the material that will be studied next. Through a good understanding of mathematical concepts, students will be able to explain the concepts they have learned, be able to distinguish between examples and non-examples based on the definitions that have been given, and be able to apply them. concepts that have been learned in solving problems [14]. The factors that influence concept understanding are; (1) factors that exist in the individual himself, emotional intelligence, motivation, and personal factors, (2) social factors. The indicators for students' understanding of mathematical concepts are (1) restating a concept, (2) providing examples and non-examples, (3) applying concepts or algorithms in problem solving. So far, there are still many problems faced by students in learning mathematics, including aspects of understanding concepts [15]. In mathematics, there are branches of science, one of which is statistics.

Mathematical statistics is a branch of applied mathematics that studies how to collect, analyze and present quantitative data. Mathematical statistics uses mathematical theories such as differential and integral calculus, linear algebra, and probability theory. Statistics is knowledge that allows us to draw conclusions inductively based on chance. Statistics, with the same situation and the same data, can also provide different ways of analyzing and come up with different conclusions [16]. Students can reason about: presenting data in the form of tables, line charts, bar charts and pie charts, average, median, mode, data distribution and probability of an event. Students can understand: presenting data in the form of tables, pie charts, line charts, bar charts, average, median, mode, data distribution, and the probability of an event. Students can apply knowledge about: presenting data in the form of tables, line charts, bar charts and pie charts, average, median, mode, data distribution and probability of an event. Students can reason about: presenting data in the form of tables, line charts, bar charts and pie charts, average, median, mode, data distribution and probability of an event.

Previous research conducted by Sugiarto stated that the results obtained from the literature study in this paper are that interactive PowerPoint learning media is important to be applied in elementary schools in online learning as an effort to improve the quality of learning and teacher competency [17]. Furthermore, Arya Wirawan stated that these results show that interactive PowerPoint learning media can effectively improve student learning outcomes, especially in the science content of Class V Elementary Schools [18] and research conducted by Fitri Utami obtained results. The general research results show that the score from the media validator obtained a percentage of 85.3% in the very category. feasible, the material validator score obtained a percentage of 87% in the very feasible category, and the student response score obtained a percentage of 82% in the very feasible category [19].

Based on the observation activities that have been carried out, researchers found that teachers still teach in conventional ways and only use minimal learning media. Based on this reality, with the use of media that is less varied, it appears when observing that students are less enthusiastic about participating in the learning process. Many students are not focused and not interested in the material taught by the teacher, because teachers still teach using lecture methods and simple media such as blackboards, pictures in textbooks which makes students less motivated to follow the learning process, moreover there are still some students cannot read fluently. Based on the explanation above, researchers will develop interactive PowerPoint-based learning media as a tool to assist teachers in increasing students' understanding of concepts statistics in class VIII.

2. RESEARCH METHODS

This type of research is quantitative descriptive research using R&D. Research aims to create products that are developed so they are suitable for use. The product developed in this research is Interactive Power Point Learning Media for class VIII statistics material using the ADDIE model; namely Analysis, Design, Development. Implementation, Evaluation. The type of data in this research is qualitative data obtained from suggestions and input from media experts and material experts at the product validation stage and quantitative data obtained from the results of media expert validation, material and language expert validation related to students' understanding of statistical concepts. The subjects were 8 respondents from class VIII students of Mts Al-Khairiyah who were chosen randomly or random sampling. The research instrument is a questionnaire. The questionnaire is used to determine the results of media expert validation, material expert validation and student responses using a Likert scale which is filled in by providing a checklist (√) in the column provided on the media expert, material expert and student response validation sheet. This learning media will be equipped with images, audio and text.

Description	Skor	Information
Not good	0%-25%	Not feasible
Pretty good	26%-50%	Not feasible
Good	51%-75%	Worthy
Very good	76%-100%	Worthy

Table 1. Conversion of Achievement Levels with Scale 4

3. RESULTS AND DISCUSSION

The results of the analysis stage based on teacher interviews and observations showed that they needed technology-based learning media that did not require a large quota, could provide explanations to students, and could be used repeatedly. Therefore, there is a need for innovative learning media in the form of interactive PowerPoint. After knowing the solution to the problem, then carry out the development stage at the media development stage which has been designed and then realized. Before the media is tested on students, this development media is first carried out by a validation test by a validator.

3.1 RESULTS

The ADDIE development model goes through 5 research stages, namely analysis, design, development, implementation, evaluation.

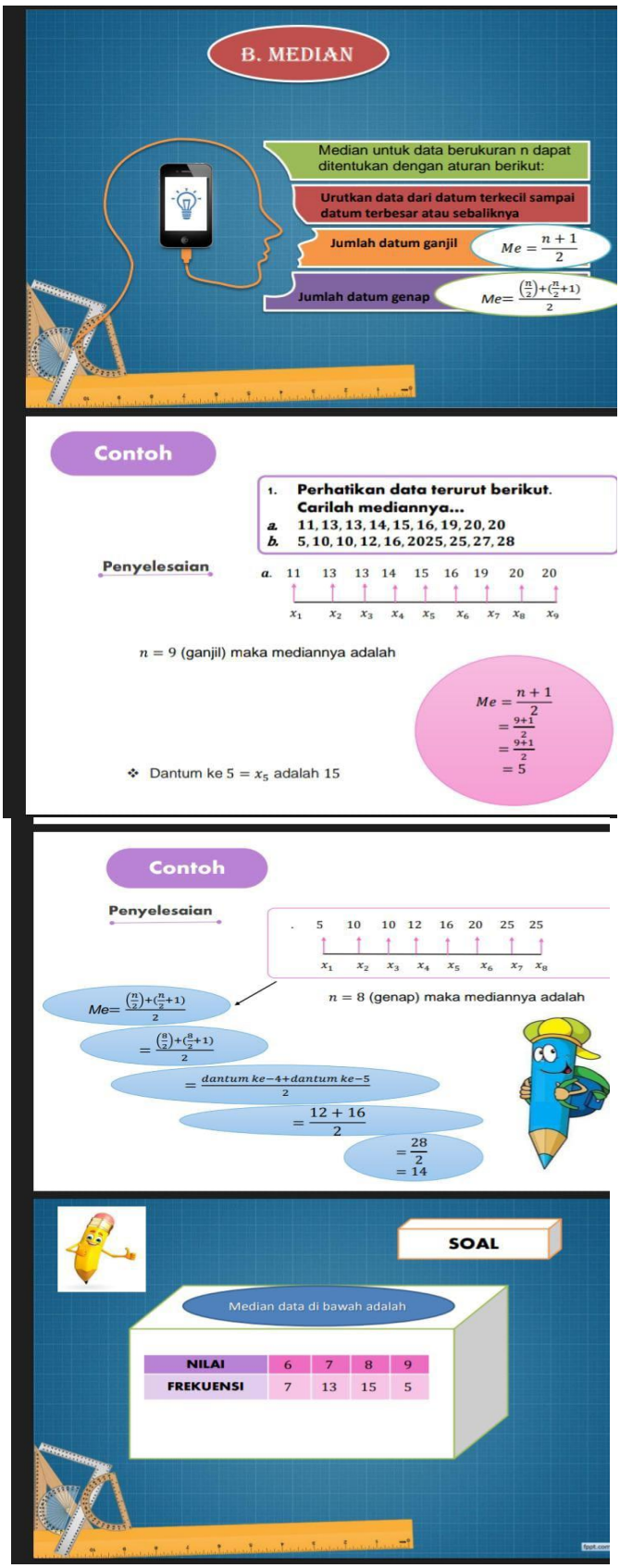
1. Analysis

   In general, we analyze the basic problem of the learning process in schools, namely students' understanding of mathematical concepts in statistics material in relation to learning media. Researchers interviewed class VIII teachers. Based on the results, students are not very active in learning in class. Students pay less attention to the teacher during the learning process because during the learning process the media used is less interesting so it cannot help increase students' understanding of statistical concepts

2. Design

   The design stage is designing the concept of the product to be developed. This development stage is to create a storyboard, flowchart which is an outline of the concept of product content to be designed. Design activities are carried out by paying attention to the suitability of learning media and learning needs which can be seen from basic competencies and indicators.


UKURAN PEMUSATAN DATA
TUNGGAL & KELOMPOK
Mean
Median
Modus
Data Tunggal
Rata-rata Hitung (mean)
01
Mean data tunggal merupakan jumlah nilai semua data dibagi dengan ukuran data. Mean adalah nilai Rata-rata
Median
02
Median adalah nilai yang membagi data terurut menjadi dua bagaian yang sama banyak
Modus
03
Modus (Mo) adalah nilai yang paling sering muncul yaitu nilai-nilai yang memiliki frekuensi paling tinggi
A. RATA-RATA HITUNG (MEAN)
Contoh
1. Rata-rata dari data 7,6,4,5,3,8,9 adalah
Rata-rata Hitung (mean)
a.
b.
Penyelesaian :
Ket :
f_i = Frekuensi
$\bar{x}$ = Nilai Rata-rata
n = Banyak Data
$\sum x_i$ =Jumlah Data
2. Tentukan mean dari berat badan 36 siswa SD Nusa Bangsa berikut :
36,35,37, 37,38,37,36,36,37,36,36,35,38,36,38
37,36,37,37,34,38,37,35,35,37,38,36,35,36,37
38,37,34,35,37,38,34
Penyelesaian :
Berat Badan (x_i)
Frekuensi (f_i)
$x_i . f_i$
34 2 68
35 6 210
36 9 324
37 12 444
38 17 266
Jumlah 36 1312
SOAL
Nilai rata-rata ujian sekelompok siswa sebanyak 40 orang adalah 51. Jika seorang siswa dari kelompok itu yang mendapat nilai 90 tidak dimasukan dalam perhitungan rata-rata tersebut, maka nilai rata-rata ujian akan menjadi...


B. MEDIAN
Median untuk data berukuran n dapat ditentukan dengan aturan berikut:
Urutkan data dari datum terkecil sampai datum terbesar atau sebaliknya
Jumlah datum ganjil
$Me = \frac{n+1}{2}$
Jumlah datum genap
$Me = \frac{(\frac{n}{2})+(\frac{n}{2}+1)}{2}$
Contoh
1. Perhatikan data terurut berikut. Carilah mediannya...
a. 11, 13, 13, 14, 15, 16, 19, 20, 20
b. 5, 10, 10, 12, 16, 2025, 25, 27, 28
Penyelesaian
a. 11 13 13 14 15 16 19 20 20
x_1 x_2 x_3 x_4 x_5 x_6 x_7 x_8 x_9
$n = 9$ (ganjil) maka mediannya adalah
$Me = \frac{n+1}{2}$
$= \frac{9+1}{2}$
$= \frac{9+1}{2}$
$= 5$
Dantum ke $5 = x_5$ adalah 15
Contoh
Penyelesaian
5 10 10 12 16 20 25 25
x_1 x_2 x_3 x_4 x_5 x_6 x_7 x_8
$n = 8$ (genap) maka mediannya adalah
$Me = \frac{(\frac{n}{2})+(\frac{n}{2}+1)}{2}$
$= \frac{(\frac{8}{2})+(\frac{8}{2}+1)}{2}$
$= \frac{dantum\ ke{-}4 + dantum\ ke{-}5}{2}$
$= \frac{12+16}{2}$
$= \frac{28}{2}$
$= 14$
SOAL
Median data di bawah adalah
NILAI 6 7 8 9
FREKUENSI 7 13 15 5

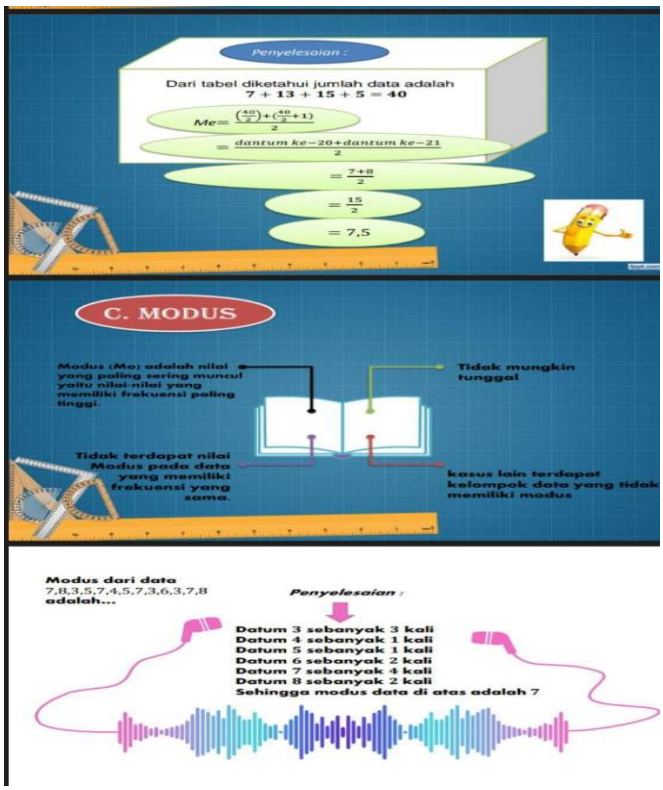


Figure 1. Interactive Power Point display of material statistical

ctiveness of using Google Forms in Even Semester Exam Questions for Class VIII ICT Subjects.

3. Development.

The Development Stage aims to produce interactive PowerPoint learning media that has been revised based on suggestions and input.

The following is a recapitulation of the assessments by three experts regarding the product development of interactive Power Point learning media:

No	Respondent	Average %
1	Media Expert	87,5%
2	Materials Expert	100%
3	Linguist	90.6%
Total		92,7 %

Table 2. Recapitulation of Validation Results

Based on the results of the recapitulation of expert test assessments involving three experts, namely, media experts, material experts and language experts, the average expert assessment of interactive PPT-based learning media was 92.7%. From the quantitative data, it was then interpreted into qualitative data, the results obtained were that the interactive PowerPoint-based learning media product on the human digestive system obtained very good criteria. When conducting an expert review, experts provide suggestions/input to researchers which can be used as a reference for improving the media so that it becomes better and suitable for use. After the development media had been declared feasible by the three experts, the researchers then conducted trials on 8 respondents. This trial aims to determine student interest, the level of student understanding of concepts and the feasibility of development

4. Implementasion

At this implementation stage, the aim is to carry out trial student responses from 8 respondents. To find out students' responses to the interactive power point learning media developed by filling in a 1-4 scale questionnaire with aspects in terms of learning media and

learning materials. The results of the small group trial can be seen in Table 3.

Aspect	No Question	Respondent								Total	%	Ket
		AB	AC	AD	AE	AF	AG	AH	AI			Not feasible
Media Easy to use	1	3	4	4	3	4	4	3	4	29	91%	Not feasible
The language used is easy to understand	2	4	4	4	4	4	3	3	4	30	94%	Worthy
Image Suitability	3	4	3	4	3	3	4	4	4	29	91%	Worthy
Interest	4	4	4	4	4	4	4	4	3	31	97%	Information
Understand the Concept Well	5	3	4	4	4	4	3	4	4	30	94%	Not feasible
Total		18	19	20	18	19	18	18	19		93,1 %	

Table 3. Result Of Respondent

In the one to one trial activity, 5 aspects were assessed with the assessment obtained being 93.1%, if described, it was included in the very suitable for use category.

5. Evaluation

The evaluation stage is the final stage of the ADDIE development model. The evaluation data was obtained from media expert validation test results, material expert validation test results and from the results of small group trials and large group trials. The validation results from media expert lecturers received 90% with a "very feasible" category. The results of material expert validation carried out with class III teachers obtained an average percentage of 90% in the "very feasible" category. The results of student responses in large group trials obtained 95% in the "very feasible" category. Based on the validation results of media experts, material experts, student responses stated that the interactive power point learning media material was flat shapes.

3.2 DISCUSSION

Learning media is a means of transmitting information. Learning media is designed to be as attractive as possible and made according to the material to be taught, so that learning objectives can be achieved optimally. The use of interesting learning media will influence students' interest in learning, so that students can more easily accept the material being studied and this will influence learning outcomes. Media Program Microsoft PowerPoint is a presentation application program that is popular and most widely used today.

This PowerPoint slide show is available with various template designs in it which are useful for displaying data or documents. Microsoft PowerPoint also functions as a presentation tool with an attractive appearance to the audience. Microsoft PowerPoint provides various choices ranging from themes, designs, animations or layouts**.** diverse. And the template or design feature will further enhance the appearance of a PowerPoint presentation. This function is very useful in the fields of education, economics, business and many more. Apart from being used for presentations that don't take a long time, Microsoft Power Point's function plays an important role in protecting the environment. Paper production is minimal because many presentations only rely on soft files. Power Point is also known to make it very easy for users to influence the audience during presentations. Users can easily convey material by creating material in the form of writing, images, animations or videos [9].PowerPoint can make the presentation of material more impressive and interesting. PowerPoint has a feature that we can use to export files into PDF format, making it easier for us when we want to print presentation material files. PowerPoint can be designed to adapt the material presented, educators not only want their

students to be able to remember the lesson material but also want their students to be able to understand the lesson material comprehensively to increase understanding to provide a learning experience that motivates students, and the interest in learning that students gain will last longer. Students have an important role in forming their understanding and increasing student awareness.

The use of interactive PowerPoint can improve students' understanding of statistical concepts by displaying various attractive template choices so that students are interested in learning, further increasing focus and attention. Using additional features such as images, video, audio and text that really motivate students' interest in learning. At the development stage, using 3 experts, the results obtained were 87.5% for media experts, 100% for material experts and 90.6% for language experts regarding students' conceptual understanding, with an average of 92.7%. Next, at the Implementation stage, several aspects are obtained, including; 1) The media is easy to use, 8 respondents answered with a total score of 29 and a percentage of 91% in the Very Appropriate category, 2) The language used is easy to understand, 8 respondents answered with a total score of 30 and a percentage of 94% in the Very Appropriate category, 3) Image suitability as many as 8 respondents answered with a total score of 29 and a percentage of 91% in the Very Appropriate category, 4) Interest S Suitability of Images as many as 8 respondents answered with a total score of 31 and a percentage of 97% in the Very Appropriate category, and 5) Understand the Concept Well as many as 8 respondents answered with a total score of 30 and a percentage of 95% in the Very Eligible category. The overall average is 93.1% with a very decent category

4. CONCLUSION

The conclusion of this research is that interactive PowerPoint-based learning media is very suitable for use, this is based on the results of the accumulated average tests of media experts, material experts and language experts which are included in the Very Good (SB) category with a score of 92.7%. Interactive PowerPoint-based learning media is also very popular with fifth grade elementary school students. This can be seen from the results of the one to one assessment with a score of 93.1 which is included in the Very Good (SB) category. Based on these two assessments, the interactive PowerPoint-based learning media that the researchers developed is suitable for use

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