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DESCRIPTIONS AND DIFFERENCES IN STUDENT PERCEPTIONS OF THE PHYSICS-MATHEMATICAL ELECTRONIC MODULE

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ABSTRACT

This research was conducted with the aim of being able to describe students' perceptions of the mathematics physics electronics module and to know the differences in students' perceptions between Regular A and B classes in the mathematics physics electronics module. This research was conducted using a mix method approach. The total sample is 60 students from two classes. The significant difference between the two classes and the correlation results show that the perception of regular classes A and B has a relationship so that this will affect the usefulness of the physics-mathematical e-module later. And currently students are feeling confused in understanding mathematics physics lessons. Students need teaching materials that are very interesting and of course easy to understand starting from the language, explanations and material. Because the better the positive perception that students give, the students feel that they really need an electronic module to be used in the mathematics physics learning.

Keywords: *electronic module; mathematical physics; student perception*

INTRODUCTION

Education is the first step for a person in supporting a better self-quality (Hekmah et al., 2019; Syaiful et al., 2021; Yantoro et al., 2021) Education is needed in the era of development in order to facilitate one's understanding in life. The reason education is an important factor in the world of life is so that a person can develop their knowledge and skills and creativity(Firdaus & Wilujeng, 2018; Mahendra, 2017; Pitorini et al., 2020). In addition, with education, the world is able to develop more rapidly with well-designed and produced technology(Anriani & Pamungkas, 2019; Grobler & Grobler, 2018; Sukmasari & Rosana, 2017). Therefore, in various parts of the world, technology has become an important part of education.

Technological developments will be more rapid as time goes by. With the development of this technology will be used positively by students, staff, lecturers and students in the field of education. The use that is often made by students and even students is to often look for information about a material being studied(Mulyaningsih & Saraswati, 2017; Redhana, 2019; Ricu Sidiq & Najuah, 2020). Indirectly this will make students and students more independent in learning(Barton & Ho, 2020; Seruni et al., 2019). This will have an impact on his brain development in understanding and analyzing a problem and the material he reads, sees or hears (Darmaji et al., 2019; Kurniawan et al., 2019; Zain et al., 2021). This rapid technology is able to develop a learning media with various types so that the learning media is not only in the form of prints.

Students have many learning media that can be used in teaching and learning activities (Cahyana et al., 2017; Efanudin, 2017; Pane & Darwis Dasopang, 2017). The media used is a tool for teachers to be able to communicate a lesson clearly and easily to understand. Assisted by sophisticated technological tools, learning media can be in the form of online such as video and audio such as applications on YouTube. This shows that learning media can be designed so attractively. The benefits obtained from learning media are that they can develop creativity, thought and innovation (Iranti et al., 2023; Mulyaningsih & Saraswati, 2017; Nurhalimah et al., 2017; Puspitasari, 2019). So that the manufacture of learning media requires tools and applications that can be designed by including features such as images, video, audio, text, and even animation(Argarini, 2018; Arif, 2017; Dian & Sri, 2017). In addition, learning media that can be designed and used properly by students, students and people who need it are electronic modules.

Electronic modules have some similarities with ordinary modules. The modules that are generally used often have a series of activities that are structured to achieve a number of goals from problems that are carried out specifically and clearly (Divayana et al., 2018; Pinontoan et al., 2021; Putra et al., 2022; Winanda et al., 2020; Wulandari et al., 2021). The difference from ordinary modules and electronic modules lies in the cost of production, the tools used in the design, physical, and others. The module is displayed in the form of sheets of paper or

printed, production costs are quite expensive because printing is required, and is not equipped with audio, video and animation(Fitri, 2019; Latifah et al., 2020; Sugihartini & Jayanta, 2017). Unlike the case with electronic modules whose use is more practical because they can be accessed on devices such as cellphones, laptops or tabs, production costs are cheaper because they do not require additional costs for printing and are more complete and attractive(Wahyudi & Lestari, 2019; Wulansari et al., 2018; Zainul et al., 2018). This electronic module is designed to even attract the attention of its users. however, it cannot be denied that the lack of this electronic module is constrained by its resources. If the user of the electronic module uses a computer, an electric power source is needed. However, so far the electronic module has always had an advantage because apart from being easily accessible, it also uses clear and good language and explanations of material, such as the explanation of physics and mathematics II which is famous for its complexity.

Mathematical physics is a subject which is a combined learning from the application of the theory of physics concepts to the theory of mathematical concepts(Hamdani et al., 2017; Saputri et al., 2016). This Mathematics Physics course is often taken by students from the department of science education and applied science. Mathematical Physics has a goal that is used to solve a problem by mixing mathematical and theoretical aspects analytically and predictively(Astalini et al., 2019; Kurniawan et al., 2012). The source used in learning mathematical physics is the book Mathematical Methods in the Physical Sciences by Mary L. Boas. With the thick use of foreign languages, it makes students difficult to understand the explanations contained in the book. So it is not wrong if the electronic module is used as a guide for students in learning mathematics and physics. Therefore, it takes student perceptions in the use of electronic modules that are used to assist students in learning mathematics and physics.

This student's perception will provide information related to the student's way of thinking, working and attitudes formed. This is a response that is reflected by students in their attitudes, actions and thoughts. Several factors influence perception such as attention, interest, need and others. Where these factors will

have an impact on the views that will be given by students to the mathematical physics electronic module. Given the importance of students' perceptions of the electronic module, this study was conducted to answer the following questions:

1. How is the description of students' perceptions of the physics-mathematical electronics module?
2. How are the students' perceptions different between Regular A and B classes in the mathematics physics electronics module?

RESEARCH METHODS

This research was conducted using a mix method approach. Where this mix method approach uses a mixed method of quantitative and qualitative methods). Qualitative research uses interviews and quantitative research uses questionnaires as a data collection, analysis and measurement tool(Joffe, 2017). Quantitative research is research conducted by measuring data systematically, in contrast to qualitative research using measuring data by describing reality, and social complexity(Vansteensel et al., 2017). With this mixed method research, you will get a more accurate result than using one of these types of research methods.

Participants

The population used in this study were students from the Jambi University Physics Education Study Program. The classes taken in this study were regular classes A and regular B from the class of 2020 with 30 students in each class. So that the overall sample from the two classes used amounted to 60 students. The technique used in sampling is purposive sampling. This purposive sampling is a sample selection based on special considerations, namely research needs. The sample of this study was determined by considering whether or not the students had contracted the physics mathematics II course.

Materials and Apparatus

Questionnaire and interview data used are students' perceptions of the mathematics physics electronic module II. The questions given were 12 questions for interviews and 6 questionnaire questions in student perceptions. The

distribution of these questionnaires and interviews uses a google form to students, then students will answer and choose the answers that have been given. Assessment in the data used using a Likert scale. This Likert scale is a form of scale that is used to collect data in order to find out or measure data that is both qualitative and quantitative. The questionnaire criteria used were strongly disagree (1), disagree (2), agree (3), and strongly agree (4). The interval values used in this criterion are as follows:

Table 1. Student Perception Criteria

Range	Criteria
6,0-10,5	Very Not Good
11,0-15,0	Not Good
15,5 -19,5	Good
20,0-24,0	Very Good

Design or Data Analysis

In the analysis of the data used in accordance with the type of method used. In testing the quantitative type of data, the researcher used descriptive statistical tests, assumption tests and hypothesis testing. In the assumption test using normality and linearity tests. If the resulting significant value is greater than 0.05 then the data is said to be normal and linear, the data can be carried out to the next test. In testing the hypothesis, it is inversely proportional to the assumption test with a significant value determination. The hypothesis test used is the T test and the correlation test. Therefore, the results of the data will be analyzed with the results of interviews. Thus, conclusions can be drawn at the end. The diagrams in this study are as follows:

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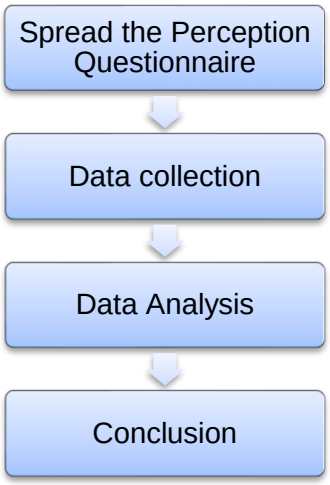

Figure 1. Research flow chart

RESULTS

Statistical Test

The first test is descriptive statistics. Where this test will display the results of the mean, min, max and the percentage of interval values obtained from the results of the calculation of the students' perception questionnaire respondents. The results of descriptive statistics are as follows.

Table 2. Descriptive statistics of students' perceptions between classes on the physics nmathematics e-module

Student response		Interval	F	Persentase	Category	Mean	Me	Min	Max
Student's Perception of E-Module in Mathematics Physics	A	6,0-10,5	0	0%	Very Not Good	3.55	3.50	3.00	5.00
		11,0-15,0	0	0%	Not good				
		15,5 - 19,5	25	75%	Good				
		20,0-24,0	5	15%	Very Good				
	B	6,0-10,5	0	0%	Very Not Good	3.64	4.00	3.00	5.00
		11,0-15,0	0	0%	Not good				

		15,5 - 19,5	7	21%	Good				
		20,0-24,0	15	45%	Very Good				

The results obtained from table 1, that the regular class A has a good perception. This can be seen from the percentage value of 75% good and in contrast to the case in class b, which has a good perception of 45%.

Inferential Test

The next step is testing assumptions which consist of normality test and linearity test. The normality test is as follows.

Table 3. Normality Test

	Kolmogorov-Smirnova		
	Statistic	df	Sig.
A Perception	.082	30	.200*
B Perception	.127	30	.137

From the results of the normality test in the regular class A, the significant value generated is 0.200. In the perception of students in class B, the significant value generated is 0.137. This explains that the data used is normally distributed. The results of the linearity test are as follows.

Table 4. Linearity Test

ANOVA Table							
			Sum of Squares	df	Mean Square	F	Sig.
A_Perception * B_Perception	Between Groups	(Combined)	1551.167	19	81.640	3.225	.798
		Linearity	319.504	1	319.504	11.903	.320
		Deviation from Linearity	1231.663	18	68.426	2.443	.960
	Within Groups		375.333	14	26.810		
	Total		1926.500	33			

The resultant linearity test is obtained that the significant value resulting from Deviation from Linearity is 0.960. This explains that there is a linear relationship between perceptions in the regular class A and in the regular class B. Then, the hypothesis testing consists of a T test and a correlation test. The results of the t test are as follows.

Table 5. t test

VARIABLE	Sig.	Sig. (2-tailed)
A Perception	0.624	0.008
B Perception	0.335	0.030

From the results obtained from the t-test obtained a significant value obtained from the perception of students in the regular class A of 0.008. Meanwhile, the perception value of students from regular class B was obtained at 0.030. This shows that there is a significant difference in perception in the regular class A and in the regular class B. The correlation test is carried out as follows.

Table 6. Correlation Test

Class	Pearson Corelation	Sig. (2-failed)
Reguler A	0.790	0.032
Reguler B	0.739	0.023

The correlation test that resulted from the regular class A was 0.032 and the correlation test resulted from the regular B was 0.023. This indicates that there is a significant relationship between the perceptions of students from the regular class A and the perceptions of students from the regular class B. This is evidenced by the significant value produced which is in accordance with the significance of the value of <0.05.

Interview result

The results of interviews conducted as many as 12 questions with the core of the question points as follows. Initial p is a researcher and m is a student.

Q : Is one of the obstacles or problems in lectures in the teaching materials?

M : Yes, the teaching materials used are classified as very difficult to understand with the use of a foreign language and a bit high.

Q : What do you expect from the physics and mathematics II teaching materials?

M : It is hoped that the mathematics physics teaching materials will be more attractive, flexible, and the content of these teaching materials will use language that is easily understood by our community.

Q : What do you think if mathematical physics is in the form of an e-module?

M : If there is, it is an extraordinary achievement, because in this sophisticated era the field of education is expected to be able to keep up with technological developments more rapidly.

DISCUSSION

The tests carried out in the descriptive statistical test explained that students had a good perception of the mathematical physics electronic module. Even though they have similarities in positive perceptions, there are still differences between the two classes in the level of perception they have. From regular class A, 75% of students have good category and 25% are very good. This explains that 100% of the perceptions of students in regular class A strongly support the electronic module of mathematical physics. In addition, from the regular class B, it is very unfortunate that out of 100%, only 69% of them have good and very good perceptions. The remaining 21% are in the bad category.

After being tested with statistical tests, the data is tested for assumptions to see whether the data is distributed according to the parametric test. The first test carried out was the Normality test, from the results of the tests carried out that the student perception data from the two classes were normally distributed. The resulting significant value is also in accordance with the provisions of the assumption test. Where the determination is the significant value generated must be worth more than 005. The result of the significant value is 0.200 for the perception of regular class A and 0.137 of regular B. Furthermore, the Linearity Test, with the value of the determination being the same as the Normality test, the data used has a linear distribution. with the results obtained in Deviation from

Linearity of 0.960. This explains that there is a linear relationship between perceptions in regular class A and in regular class B.

The next test is a hypothesis test using t test and correlation test. T test is used to see the significant difference of the variables used. From the results obtained that there is a significant difference between the perceptions of students in regular class A and regular class B. The difference is seen based on the significant values generated by 0.08 and 0.038. Different from the determination of the assumption test, this hypothesis test has a determination in which a variable has a difference and a relationship if the resulting significant value is not more than 0.05. The correlation test produced is 0.032 students' perceptions in regular class A and 0.023 perceptions of students in regular B classes. Therefore, it can be said that there is a significant difference between the two classes and from the correlation results that perceptions of regular classes A and B have a relationship so that this will affect the usefulness of the mathematical physics e-module later.

The results of the interview explained that currently students are feeling confused in understanding mathematics physics lessons. Because the teaching materials used are somewhat foreign in their use of the language and the physics and mathematics materials are indeed difficult to understand. Students need teaching materials that are very interesting and of course easy to understand starting from the language, explanations and material. In this era of increasingly rapid technology, students really support electronic modules as guidebooks or teaching materials in learning. This electronic module will later explain something that is not found in the explanation of the printed book or printed module, because this electronic module is equipped with image, audio and even animation features. Therefore, students of the physics education study program gave a very good perception in this regard. So that later this electronic module will be used properly by students who contract physics and mathematics courses.

The impact of this electronic module, of course, has an impact in 2 areas, namely a positive impact and a negative impact. The positive impact for students is that students will get used to the use of technology that is used positively so that they can be more able to develop student potential starting from the use of electronic teaching materials. The long term impact on students is that students

will be more accustomed to being independent in studying a problem, students will develop cognitive aspects in themselves due to the influence of positive technology. Even so, the negative impact that occurs is that students will depend on digital devices that are used such as cellphones, tabs, laptops and computers to open this electronic module so that it requires a power source. The long-term impact is that books may become a source of ancient teaching materials later when the world is developing in terms of technology, but this is unlikely to happen because humans will always use books as the key to the world after the internet.

This study is in line with previous research in discussing student perceptions. research conducted(Yodha et al., 2019) regarding student perceptions of the implementation of e-learning in the information system management course for students majoring in educational technology at the State University of Malang. The study found that students were enthusiastic in using e-learning because learning was done online. In addition, other research regarding student perceptions of online learning in practical courses in vocational education obtained the results of students' perceptions of online learning in practical courses that were positive, with details of teaching and learning aspects of 66.4%, capability aspects (lecturers' abilities) by 74.6%, and aspects of facilities and infrastructure by 72.7%(Maulana & Hamidi, 2020). In this case it is different from the research that the author did.

Where this study focuses more on student perceptions of the physics and mathematics electronics module. This research is very important to do because there are still few teaching materials used by students that match student understanding. In addition, difficult material can be visualized with animations that match the material so that it can help students better understand the essence of the material. However, this research has limitations, such as measuring student responses to the mathematical physics electronic module and the knowledge possessed by students in mathematics physics learning where this knowledge can be used as a reference in making the electronic module later.

The essence of this research is the description of students' perceptions of the mathematics physics electronics module and the differences in student perceptions between Regular A and B classes in the mathematics physics electronics module thinking about positive perceptions of the mathematical physics

electronics module. In other words, whether differences are formed based on the environment or from within the individual student. It is known that the perceptions held by students are equally positive. However, regular class A seems to have a much better perception than regular class B. This can happen from the needs and interests of students. Because the better the positive perception that students give, the students feel that they really need an electronic module to be used in the mathematics physics learning.

CONCLUSION

The students' perception descriptively explained that in the regular class A it really supports the electronic module of mathematical physics, although in the regular class B it also supports it, but seen from the descriptive value that students in the regular class A have high scores in the good to very good category. The results of the interview explained that currently students are feeling confused in understanding mathematics physics lessons. Because the teaching materials used are somewhat foreign in their use of the language and the physics and mathematics materials are indeed difficult to understand. Students need teaching materials that are very interesting and of course easy to understand starting from the language, explanations and material. It is known that the perceptions held by students are equally positive. However, regular class A seems to have a much better perception than regular class B. This can happen from the needs and interests of students. Because the better the positive perception that students give, the students feel that they really need an electronic module to be used in the mathematics physics learning.

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