Preliminary studies: Analysis Of Student Needs For The Use Of Multiple Integral E-Module Of Mathematics Physics I Course

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Articles Information	Abstrak
Keywords: E-module, Mathematics Physics, Multiple Integral,	Tujuan dari penelitian ini ialah untuk mengetahui bagaimana level serta pendapat mengenai e-modul materi integral lipat yang rencananya akan dikembangkan. Jenis penelitian ini ialah mixed method dengan teknik pengambilan sampel yang digunakan ialah purposive sampling. Sampel yang digunakan merupakan mahasiswa aktif kelas reguler B 2019 yang pernah mengontrak mata kuliah fisika matematika I. Instrumen yang digunakan ialah berupa angket dan lembar wawancara yang dimana di analisis menggunakan statistik deskriptif untuk angket dan wawancara dianalisis menggunakan miles and huberman. Hasil yang didapatkan menunjukkan bahwa sebagian besar sampel berpendapat bahwa e-modul merupakan gagasan yang sangat baik, hal ini dapat dilihat dari hasil statistik deskriptif nilai rata-rata sebesar 22,4 dimana berada pada kategori dibutuhkan, hasil data kuantitatif ini diperkuat dengan hasil wawancara yang sebagian besar mendukung pembuatan e-modul ini.
Submitted: 06-02-2022 Accepted: 17-02-2022 Published: 26-02-2022	**Abstact** The purpose of this research is to find out how the level and opinion regarding the multiplemultiple integral e-module material that is planned to be developed. This type of research is a mixed method with the sampling technique used is purposive sampling. The sample used is an active student of regular class B 2019 who has contracted a physics mathematics course I. The instruments used are in the form of questionnaires and interview sheets which are analyzed using descriptive statistics for questionnaires and interviews are analyzed using miles and huberman. The results obtained indicate that most of the samples think that the e-module is a very good idea, this can be seen from the results of descriptive statistics, the average value is 22.4 which is in the required category, the results of this quantitative data are strengthened by the results of interviews that mostly support the creation of this e-module.

INTRODUCTION

Education is a deliberate effort to develop human potential which is carried out by guiding and facilitating learning activities (Muslim et al., 2021; Chen et al., 2021). Education is basically a very important main sector in supporting other sectors (Rini et al., 2020). Because with education, humans will become educated which will later be useful in the development process of a country (Chen et al., 2021). With reference to this, it is necessary to improve the quality of education that can be done by creating a comfortable student learning environment, especially for physics learning which mostly contains abstract and confusing discussions (Kusuma et al., 2017; Lestari et al., 2019).

Physics is a branch of science that specifically examines various problems and phenomena in everyday life. The purpose of physics lectures is to educate students to think critically, analytically, and systematically in solving problems related to everyday life (Bancong & Song, 2018; Fitriani et al., 2021). However, in the process it is often found that physics is often considered difficult for most students, especially for mathematics physics lectures that combine elements from two fields of study, namely mathematics and physics (Astalini et al., 2021). Therefore we need an innovative learning media that can simplify complex materials. One of the media that is often offered and considered effective is the use of electronic modules (e-modules).

E-module is an electronic-based learning media innovation that is flexible and cost-effective. E-modules are generally used to simplify some materials that are considered complex and the study is quite difficult, such as physics (Sitorus et al., 2019). In physics lectures themselves, mathematics physics courses are often considered difficult by most students. They think that language differences and the use of difficult sentences and similarities often make them confused in understanding the material taught by the lecturer (Astalini et al., 2021). The e-module itself is considered more effective than the print module, which has drawbacks in its use. Print modules tend to have to be carried using containers or places such as bags or others, if carried directly it will be very inconvenient for users (Herawati & Muhtadi, 2018). In addition, the print module itself is very difficult to find sentences or words, in contrast to the e-module which only needs to type and will automatically search for keywords which are certainly very useful for learning mathematics and physics, which mostly use scientific terms. Based on this, the author argues that one solution to overcome this problem is to create an e-module that is integrated with multiple integral material. However, before making an e-module, it is necessary to analyze the needs and opinions of students regarding the e-module that will be made. Based on the description above, the objectives of this research are; (1) describe the level of student need for the multiple integral e-module for physics mathematics I; (2) describe students' opinions regarding the e-module of multiple integral material for the physics mathematics course I.

METHOD

In various types of research, the author has chosen a mixed method. Mixed method research is research that combines quantitative data and qualitative data into one (Arikunto, 2012; Sundayana, 2018; Astalini et al., 2021). The sample used is an active class B physics education student who has contracted a physics mathematics course I. The sampling technique used is purposive sampling, purposive sampling is a sampling technique carried out by determining the category of the sample.

The instruments used are divided into two, namely quantitative instruments in the form of questionnaires on student needs and qualitative instruments in the form of interview sheets. The questionnaire used contains 6 statements, for the lattice of the questionnaire instrument the needs can be shown in Table 1.

Table 1. Grid of the questionnaire instrument for student needs

Indicator	No. Statement
Material Difficulty	1
Condition of the media used	2, 3, 4, 5, 6

Questionnaires were distributed to 30 students who had a Likert scale of 1 to 5 with details: 1 (strongly disagree), 2 (disagree), 3 (quite agree), 4 (agree), 5 (strongly agree). Then the range is determined as follows table 2.

Table 2. Range of categories of student needs questionnaires

Interval	Student Needs Level
25.21 – 30.00	Very needed
20.05 – 25.20	Needed
15.61 – 20.04	Enough needed
10.81 – 15.60	Not needed
6.00 – 10.80	Very unneeded

Then the interview contains 12 questions asked by a student related to student needs regarding media in the form of e-modules in learning mathematics physics I multiple integral material. As for the grid of the interview sheets, it can be seen in Table 3.

Table 3. Grid of student interview instruments

Indicator	No. Item
Following the process of mathematics physics lectures I	1, 2, 3
Teaching materials used in lectures	4, 5
Constraints or problems in lectures	6, 7
Solutions expected by lecture participants	8
If a module is made, what kind of module is expected by the lecture participants?	9, 10, 11, 12

After the data is obtained, the writer then analyzes the data. The data analysis technique used is descriptive statistics for quantitative data and Miles Huberman for interview data with students.

The research procedure begins with planning which includes instrument preparation and sample selection. After planning, the researcher then collects data and analyzes the data obtained, the results of the analysis are then concluded to answer the objectives of the study.

RESULT AND DISCUSSION

This Results For the results of descriptive statistical tests assisted by the SPSS version 25, as for the results can be seen in the table below.

Table 4. The results of descriptive statistical tests on the level of student needs for multiple integral e-modules

interval	Me	Med	Max	Min
25.21 – 30.00				
20.05 – 25.20				
15.61 – 20.04	22.4	22.5	30	16
10.81 – 15.60				
6.00 – 10.80				
Total				

To strengthen the results of quantitative data, researchers also collect qualitative data by conducting interviews. The interview was conducted with one of the students with the initials AMN class 2019, while the results of the interview can be seen in Table 5.

1. Q: Have you taken mathematics physics class I?
   A: Already

2. Q: Is this the first time you have attended a physics-mathematical class I?
   A: Yes

3. Q: How many times have you attended physics and mathematics class I?
   A: One meeting per week

4. Q: Do you have literacy in mathematics physics class I?
   A: Some are there

5. Q: What do you think about the literacy used in mathematics physics lectures I?
   A: Enough but not detailed

6. Q: Do you have any problems or problems during the physics lecture of mathematics I?
   A: The problem is that the understanding is a bit lacking and the teaching materials are mostly in English

7. Q: What is one of the obstacles or problems in mathematics physics lectures I?
   A: Yes

8. What do you expect from mathematics physics teaching materials I?
   A: More variety so that it can be understood

9. Q: Would you like it if the physics of mathematics I was in the form of an electronic module?
   A: Very happy because I can help with studies

10. Q: What do you think if mathematics physics I was made an electronic-based lecture module?

A: I agree, because this can be used as an alternative learning

11. Q: If there is an electronic module in mathematics physics I, what do you think can help the process of studying mathematics physics I?

    A: Some may help if the electronic module is appropriate for learning

12. Q: If there is an electronic module in mathematics and physics I, what do you expect from the electronics module?

    A: It is hoped that it can help students better understand the material being taught

The results of interviews from interviewees, namely students, from a resource person, the results obtained tend to be positive and support the creation of a multiple integral e-module for mathematics physics courses.

Based on the results of the descriptive statistical test in Table 4, it was found that as many as 7 students considered that e-modules were needed, 13 people considered e-modules needed, and the remaining 10 students considered e-modules to be sufficient in learning mathematics physics. With reference to these results, it can be seen that most students need an interactive learning media to help them understand the multiple integral material in the mathematics physics course.

The results of the descriptive statistical test were strengthened by the results of interviews which stated positive results where students supported the creation of e-modules that had been offered by researchers. The results of this interview itself are intended to strengthen the quantitative data that was previously obtained (Insani, 2016). From the results of interviews, it can be seen that one of the obstacles that cause them to lack understanding of the material is learning resources that speak English, this itself is similar to that found in the research of Astalini et al., (2021) which argues that one of the main obstacles that make students have difficulty In understanding mathematical physics material, the books used are still in English. Based on this, the authors consider that the e-module needs to be developed further (Wahyudiana et al., 2021).

This research is considered very important for students because this research is the beginning of the development of electronic modules (e-modules). E-modules themselves have several advantages compared to print modules in general, the selection of e-modules tends to be suitable for abstract materials such as physics, especially mathematics physics courses I. By using e-modules, students can easily access the e-modules provided (Puspitasari, 2019). Another advantage of e-modules compared to the print module itself is that it can be accessed for a long time and does not require complicated maintenance compared to the print module. The print module itself must be cleaned because if it is not treated it will cause damage to the print module itself. In addition, print modules cannot include video, sound or animation, so it can be concluded that print modules tend to be less interactive than e-modules (Siang, 2017).

This research is basically an early stage in developing a learning media. This research is very useful especially for writers to know the characteristics of a sample population. In addition, the initial analysis is

useful in facilitating researchers in preparing plans that will later be carried out in developing a learning media. Then for students, this research is useful to see how important the use of media in learning, especially physics, is so that students can analyze their difficulties in understanding the material. Then for teachers, this research is useful for knowing the characteristics of classroom learning which can later be used to help select the right learning media so that learning can be more effective (Nur & Mustaji, 2021).

The research conducted by the author is to conduct a preliminary study by analyzing the need for making e-modules in mathematics physics courses. The preliminary study itself is used to see the characteristics of the population to be studied later (Afnan et al., 2020). In contrast to previous studies, most studies that take preliminary studies are very rarely carried out. Research by Gunawan et al., (2017) has done something similar, but the study he did was in a virtual laboratory, this is different from researchers whose object of study is an electronic module. Meanwhile, research from Afrizon (2018) examines the design of science learning. Based on previous research, the research conducted by the author complements previous research.

The research carried out still has several shortcomings, namely the sample used is not too large, the analysis of quantitative data is only limited to descriptive statistics, and interviews are conducted only to a few students. However, this study has several advantages, including using two types of data and conducting more detailed interviews. With reference to these advantages and disadvantages, the researcher recommends that further research be added to the sample, added to test the hypothesis, and also added interview.

CONCLUSION

Based on the results that have been obtained, the researchers got an average value of 22.4 which is in the required category range which states that e-modules are needed in learning mathematics physics. The data is reinforced by the results of interviews which indicate that the e-module needs to be developed because the previous sources were mostly in English. By referring to the results and discussion, it can be concluded that the multiple integral e-module really needs to be developed for students .

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