



Mathematical Physics E-Module : Study of Students' Perception Based on Gender

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ABSTRAK

Fisika matematika sering dianggap mahasiswa sebagai mata pelajaran yang sangat sulit untuk dipelajari, salah satu penyebab yang membuat hal tersebut terjadi adalah kurangnya media pembelajaran yang mendukung siswa. Selain itu, sebagian besar media yang ada menggunakan bahasa asing, sehingga dalam hal ini diperlukan media pembelajaran bahasa Indonesia yaitu e-modul fisika matematika pada materi vektor yang kemudian dilihat dari respon siswa berdasarkan perbedaan gender. Penelitian ini bertujuan untuk menganalisis persepsi siswa terhadap e-modul fisika matematika dan untuk menganalisis persepsi siswa berdasarkan perbedaan gender dalam e-modul fisika matematika. Jenis penelitian ini adalah penelitian berbasis survei dengan pendekatan kuantitatif. Populasi penelitian ini adalah mahasiswa pendidikan fisika yang mengontrak fisika matematika dengan sampel 80 mahasiswa kelas A dan kelas C. Instrumen yang digunakan dalam penelitian ini berupa angket persepsi mahasiswa berjumlah 15 pertanyaan dan lembar wawancara sebanyak 10 pertanyaan. Teknik analisis data yang digunakan dalam penelitian ini adalah analisis statistik deskriptif dan analisis data inferensial menggunakan uji-t. Hasil penelitian menunjukkan bahwa secara keseluruhan mahasiswa memiliki persepsi positif dengan nilai persepsi 60% dalam kategori sangat baik dan 40% dalam kategori baik, sedangkan jika dilihat dari perbedaan gender siswa laki-laki memiliki nilai persepsi 76,6% dalam kategori sangat baik dan 23,3% dalam kategori baik, untuk siswa perempuan 50% dalam kategori sangat baik dan 50% dalam kategori baik. Artinya, siswa dengan perbedaan gender memiliki perbedaan persepsi yang mencolok. Persepsi siswa dapat dijadikan sebagai faktor penentu dalam pemilihan bahan terbuka. Dari hasil dapat diketahui bahwa perbedaan gender dapat membantu dalam memberi penilaian terhadap produk yang dibuat sehingga akan mendukung proses pembelajaran dan meningkatkan motivasi belajar siswa.

ABSTRACT

Mathematics physics is often considered by students as a very difficult subject to learn, one of the causes that makes this happen is the lack of learning media that supports students. In addition, most of the existing media use foreign languages, so that in this case Indonesian language learning media is needed, namely the mathematical physics e-module on vector material which is then seen from student responses based on gender differences. This study aims to analyze students' perceptions of the mathematics physics e-module and to analyze students' perceptions based on gender differences in the mathematics physics e-module. This type of research is survey-based research with a quantitative approach. The population of this study was physics education students who contracted mathematical physics with a sample of 80 students. The instrument used in this study was a student perception questionnaire with 15 questions and an interview sheet with 10 questions. The data analysis technique used in this research is descriptive statistical analysis and inferential data analysis using t-test. The results showed that overall students had a positive perception with a perception value of 60% in the very good category and 40% in the good category, whereas when viewed from the gender difference, male students had a perception value of 76.6% in the very good category and 23, 3% in the good category, for female students 50% in the very good category and 50% in the good category. That is, students with gender differences have striking differences in perceptions. Student perceptions can be used as a determining factor in the selection of open materials. From the results, it can be seen that gender differences can help in assessing the products made so that they will support the learning process and increase student learning motivation.

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1. INTRODUCTION

21st century learning in the industrial revolution 4.0 requires innovation and the use of technology that goes according to the development of science (Henriksen et al., 2016; Hussin, 2018; Ilmi et al., 2021). Education that is built on 21st century competencies (revolutionary era 4.0) focuses on learning that requires students to

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have skills, knowledge, conceptual understanding, and abilities in the fields of technology, media, and information (Huda et al., 2019; Kimbrel, 2020). The quality of education can be achieved by utilizing technology, one of which is in the provision of education in general as well as as a medium of learning in the classroom because it will greatly help students (Hew et al., 2019; Nurabadi et al., 2018). E-learning is defined as the use of information and communication technology in various educational processes to support and improve learning (Hasyim & Haling, 2017; Mahande, 2019; Vebrianto & Syafaren, 2018) one example of the application of e-learning is the e-module or electronic module. E-module is a product of digital-based non-printed teaching materials that can display text, images, animations, and videos through electronic devices such as computers or smartphones (Astalini et al., 2019; Nisa & Andriani, 2020; Serevina & Sari, 2018). E-modules are also a learning resource that contains systematic and interesting materials, methods, limitations and evaluation methods for students designed to achieve competencies that are in accordance with the curriculum electronically (Mazidah et al., 2020; Rahayu & Sukardi, 2020; Sitorus et al., 2019). The use of language in the e-module itself is made simple and systematic so that it is easily understood by students (Gavrilenko, 2018; Pratono et al., 2018; Elvarita et al., 2020). According to research from several experts (Astalini et al., 2019; Rahayu & Sukardi, 2020; Mulyadi et al., 2020) the use of e-modules can increase the effectiveness of student learning in understanding the material. The ability of students to understand the material is of course the main focus in making e-modules, one of which is if the material is difficult and abstract like physics.

Mathematical physics is a branch of the study of physics that discusses in a structured and systematic way about quantum theory analytically using mathematical equations (Petrova, 2020; Ellianawati, et.al, 2017; Jassim & Vahidi, 2021). Topics covered are related to advanced courses such as mechanics, modern physics, etc. Which contains a description of the problem and how to solve it (Saputri, Fadilah, & Wahyudi, 2016; Tanjung, 2018; Bustami, Ngadimin, & Farhan, 2020). Many students have difficulty getting satisfactory results, most of them think that the learning media are quite few and also still in foreign languages. By looking at the need for an interactive and communicative media for students, it is necessary to have a product in the form of an electronic module that is integrated with the perceptions and attitudes of students towards the course (Pathoni, et.al, 2017; Jazuli, Azizah, & Meita, 2018; Darmaji, Astalini, & Kurniawan, 2019). Perception is a person's perspective through the process of the five senses to achieve awareness and requires certain items to understand information (Sickle, 2016; Qiong, 2017; Yunita & Maisarah, 2020). We often find that one's perception of the product is aimed at seeing the quality of the product to be used as a learning resource or not (Hadaya et al., 2018; Serevina et al., 2018; Sofyan et al., 2019). This perception is carried out to find out how students view the mathematics physics e-module I on vector material using Flip PDF Professional software. Flip PDF Professional is an e-book maker software in the form of a flipbook that utilizes various media such as audio, video, and flash (Komikesari et al., 2020; Seruni et al., 2019; Sriwahyuni et al., 2019). This perception will also look at perceptions based on gender differences in each class. Gender itself is a social category that refers to an individual's gender identity, which is divided into women and men (Perry et al., 2019; Sullivan, 2020). In their own perception, gender differences are differences in characteristics, traits, and ways of thinking between men and women (Anggoro, 2016; Rizkiyah, Susanto, & Nugroho, 2016). Women's ways of thinking are clearer and their emotions are more visible than men who use their minds more often or are realistic (Hamama et al., 2019; Dilla, Hidayat, & Rohaeti, 2018; Darsini, Fahrurrozi, & Cahyono, 2019). Differences in the way of thinking between women and men in the use of e-module media can affect student learning outcomes.

This research was conducted as a complement to previous research. as for some research related to this research is research about students' perceptions of learning e-modules in the Core Atomic Physics course with the result that students have a good perception of the e-module products made (Pathoni et al., 2017). Then research regarding the e-module of the Kinetic Theory of Gases based on 3D Pageflip Professional with the result that students tend to have a good perception of the e-module that is compatible with physics learning materials (Putri et al., 2020). And the last one is in the research about the development of e-module-based Basic Physics I teaching materials with the result that the products developed are suitable for use so that students are able to study independently (Ramadhan et al., 2020). Based on several studies that have been presented above, no research has been found related to the study of student perceptions of e-modules in the Mathematics Physics course, and there is no perception assessment by considering gender differences among students. This is because the difference in human sex is important to be involved in the comparison of the two perceptions of the object to be perceived (Çera et al., 2018; Gazzola et al., 2020; nal et al., 2018). Therefore, to complement the shortcomings of previous research, the researcher wishes to conduct research by examining student perceptions of the Mathematics Physics e-module by considering the differences in student gender. Based on the description presented, the researchers conducted this study with the aim of analyzing the level of students' perceptions of the physics-mathematical e-module and to determine student perceptions based on gender differences in the physics-mathematical e-module.

2. METHOD

This study uses a quantitative research approach. Quantitative methods are commonly used to analyze data such as questionnaires (Alshenqeeti, 2014; Apuke, 2017). Quantitative research is conducted to investigate causal hypotheses that can be manipulated by comparing one or more groups with one comparison group (Appelbaum et al., 2018; Korstjens & Moser, 2017). This study aims to see the differences in student perceptions of e-modules in class A and class C, and also aims to see differences in student perceptions of e-modules based on gender in class A and class C. The population in this study were students of physics education class of 2019 Jambi University. The sample used in this study were all students of physics education with a total of 80 people consisting of 40 people for class A and 40 people for class C. The sample used in this study was obtained using a simple random sampling technique. Simple random sampling is the simplest and most commonly used method where every member of the population has an equal chance of being selected as a subject and producing optimal data (Etikan & Bala, 2017; Pal et al., 2018; Sharma, 2017)

The data in this study were obtained from quantitative data using a questionnaire. Questionnaires are a useful method for easily collecting data from participants in a study using a rating scale (Owusu-Fordjour, Koomson, & Hanson, 2020; Cagetti et al., 2020). Data collection is done by distributing questionnaires or questionnaires via Google Form to students and then filling in the statements that have been given. The questionnaire used in this study was made using a Likert scale. Likert scale which is a scale to measure perceptions related to statements that focus on a person's attitude towards something (Joshi et al., 2015; Willits et al., 2016; Wu & Leung, 2017). Research questionnaires given to students have different scores, namely Very Good (SB) = 4, Good (B) = 3, Not Good (TB) = 2, and Very Not Good (STB) = 1. The grid of data collection instruments used in this study can be seen in Table 1.

Table 1. Grid of Student Perception Questionnaire Instruments

Assessment Indicator	Rated aspect
E-Module Display	Text clarity
	Multimedia size fit
	Clarity of color and shape
	Multimedia display quality is good
	The multimedia presented is interesting
Presentation of Material in E-Modules	Easy to understand material
	The order of the material is clear
	The sentences used are simple and easy to understand
	The language used is communicative
	The suitability of the example with the material
Benefits of E-Modules	Multimedia compatibility with the material
	Ease of use of the module
	Media can help students understand the material
	Interest in using mod mod
	Increased learning motivation

The data analysis technique in this study used descriptive statistical analysis and analytical statistics. Descriptive statistical analysis was carried out with statistical calculations which included mean, mode, median, standard deviation, minimum value and maximum value (Winarsunu, 2017; Odhier et al., 2019; Nurwulandari & Darwin, 2020). t test is used if the data is normally distributed and homogeneous. Homogeneity test is to find out whether the variance of the data population is the same or not. After the homogeneity test has been fulfilled and the data is known to be normal, the researcher can then perform the direct t test without having to test the linearity assumption. Analytical statistical analysis was carried out using a different test, namely the t test, which was then focused on the comparison of perceptions per gender of each class (Zhu, et.al, 2019; Masni, Ralmugiz, & Rukman, 2020; Ramdahan, 2020).

3. RESULT AND DISCUSSION

Result

This research was conducted on students of physics education class 2019 regular classes A and C consisting of 80 students in total. This study aims to see how students Identification of Problems Creating E-

modules Students Perception Conclusion perceive the e-module of mathematics physics I based on the Flip PDF Professional application on Vector material. The result data obtained in the questionnaire were analyzed using IBM SPSS Statistic 22 which consisted of the perceptions of students in class A and C, perceptions of students in class A, perceptions of students in class B, perceptions of students in class A based on gender, and perceptions of students in class C based on gender. The results obtained are represented in the Table 2.

Table 2. Results Description Data Perceptions of students Against E-module Mathematical Physics

Interval	F	%	Category	Mean	Median	Mo	Max	Min	Std
48,76 – 60,00	48	60	Very Good						
37,51 – 48,75	32	40	Good						
26,26 – 37,50	0	0	Not Good	50,88	49,0	45	60	43	5,089
15,00 – 26,25	0	0	Very Not Good						

From Table 2 about the results of descriptive statistics on student perceptions of the physics-mathematical e-module, the average value (mean) is 50.88, the median value is 49.0, the mode is 45, the maximum and minimum values are 60 and 43, respectively, and the standard deviation of 5.089. In addition, it was also found that 48 of the students (60%) had a very good perception of the e-module and the remaining 17 students (40%) had a good level of perception of the e-module given. After analyzing the statistical descriptions of student perceptions, the next researcher conducted a descriptive statistical analysis with the second variable, based on student gender differences. The descriptive results of the perception statistics based on gender science students towards e-modules can be seen in Table 3.

Table 3. Table of Data Results Description of Perception Statistics by gender of students

Gender	Interval	F	%	Category	Mean	Med	Mo	Max	Min
Male	48,76 – 60,00	23	76.6	Very Good					
	37,51 – 48,75	7	23.3	Good					
	26,26 – 37,50	0	0	Not Good	52,26	52	57	60	45
	15,00 – 26,25	0	0	Very Not Good					
Female	48,76 – 60,00	25	50	Very Good					
	37,51 – 48,75	25	50	Good					
	26,26 – 37,50	0	0	Not Good	50,06	48,5	45	60	43
	15,00 – 26,25	0	0	Very Not Good					

From Table 3 regarding the data on the results of statistical descriptions of student perceptions based on gender, the average value (mean) is 52.26 for men and 50.06 for women, the median value is 52 for male perceptions and 48.5 for women. , the mode is 57 for male gender and 45 for female gender, the maximum and minimum values are 60 and 45 for men and 60 and 43 for women, then the standard deviation value is 4,667 for the perception of men and women. 5.195 for women's perceptions. In addition, there were also 23 male students (76.6%) who had very good perceptions of e-modules and the remaining 7 people (23.3%) who had good perceptions of e-modules and for women around 14 people (43.75) had a very good perception of the e-module and the remaining 18 students (56.25%) had a good level of perception of the e-module given.

After conducting descriptive statistical tests on the variables used, the researchers conducted prerequisite tests, namely by conducting normality tests and homogeneity tests. This normality test is carried out to see whether the data is normally distributed or not. The results of the normality test, it is known that the significance value of Asymp. Sig. (2 –tailed) of 0.190 where the value is greater than 0.05. So according to the basis for decision making in the Kolmogorov-Smirnov normality test above, it can be concluded that the data are normally distributed. Thus, the assumptions or requirements for normality in the regression model have been met. After the normality test was met, the researcher conducted the final prerequisite test, namely by conducting a homogeneity test. This homogeneity test serves to see whether the data is homogeneous or not. The results of the data homogeneity test, it is known the value of Sig. Levene's Test for Equality of Variances for the student perception variable is 0.305 (this value is the same as the results of the homogeneity test with the first and second values). Because the value of Sig. 0.305 > 0.05, it can be concluded that the data variance of students' perceptions of the mathematics physics e-module in class A and C is homogeneous. After completing the prerequisite test, namely testing normality and homogeneity. The next researcher tested the hypothesis, namely the independent t-test. The t-test is an example of a parametric test that works on normally distributed scale data and compares the two most frequently used means (Fathy et al., 2016; Gerald, 2018). As presented in the results of the data Table 4.

Tabel 4. Independet Sample T Test for Class A and C

Class	N	Mean	Std. Deviation	t-Test Sig. (2-tailed)
A	40	51.48	5.109	0.035
C	40	50.30	5.065	

Based on the table above, it is known that the number of data on student perceptions of the E-Module for class A is 40 students, while for class C is 40 students. The average value of student perception results or the mean for class A is 51.48, while for class C is 50.30. In the t-test, the Sig value is known. (2-tailed) of $0.035 < 0.05$, so as the basis for decision making in the independent sample t test, it can be concluded that H₀ is rejected and H_a is accepted. Thus, it can be concluded that there is a significant difference between the perception results of class A and class C students. After conducting an independent sample t test in general for both classes, then the researcher conducted the same test based on the gender of the students per class, namely class A and class C, as presented in the Table 5.

Tabel 5. Independent Sample T Test for Class A

Gender	N	Mean	Std. Deviation	t-test Sig. (2-tailed)
Male	16	53.75	4.389	0.019
Female	24	49.96	5.069	

Based on Table 5, it is known that the number of data on student perceptions of the E-Module for class A is 16 male students and 24 female students. The average value of student perception results or the mean for men is 53.75, while for women it is 49.96. In the t-test, the Sig value is known. (2-tailed) of $0.019 < 0.05$, so as the basis for decision making in the independent sample t test, it can be concluded that H₀ is rejected and H_a is accepted. Thus, it can be concluded that there is a significant (significant) difference between the perception results of male and female students in class A.

Tabel 6. Independent Sample T Test for Class C

Gender	N	Mean	Std. Deviation	t-test Sig. (2-tailed)
Male	14	50.57	4.536	0.017
Female	26	50.15	5.409	

Based on Table 6, it is known that the number of data on student perceptions of the E-Module for class A is 14 male students and 26 female students. The average value of student perception results or the mean for men is 50.57, while for women it is 50.15. Thus, statistically descriptive, it can be concluded that there is a significant difference (significantly) or not, so we need to interpret the independent sample test table from Class C below. In the t-test, the Sig value is known. (2-tailed) of $0.017 < 0.05$, so as the basis for decision making in the independent sample t test, it can be concluded that H₀ is rejected and H_a is accepted. Thus, it can be concluded that there is a significant (significant) difference between the perceptions of male and female students in class C.

Discussion

Perception is how someone perceives something consciously. In this study, the researcher will see how the perceptions of students in grades A and C are, and how the differences in the perceptions of the two classes are when grouped again by gender. The data from the perception itself was obtained from a questionnaire that had been distributed to active students of physics education at Jambi University batch 2019 via Google Form. In this study, the researcher added a gender variable as a separation of student perceptions. In some studies gender is also a factor that affects one's perception, girls tend to follow the majority of classes and are more competitive in choosing something while boys are more likely to prioritize personal concepts (Çera et al., 2018; Ogungbamila & Bola Udegbe, 2014; Samuelsson & Samuelsson, 2016; Rizkiyah, Susanto, & Nugroho, 2016). In their own perception, gender differences are differences in characteristics, traits, and ways of thinking between men and women (Desiningrum, 2015; Anggoro, 2016; Rizkiyah, Susanto, & Nugroho, 2016). The data obtained were then analyzed using descriptive statistical analysis techniques and inferential statistics. Based on the analysis results obtained for the two classes tested with a total sample of 80 students, it was found that 48 students (60%) stated that the e-module was very good while the remaining 32 students (40%) stated that the e-module was at good category with the mean value is 50.88 then the median value is 49, the mode value is 45,

and the maximum and minimum values are 60 and 43, respectively, and the standard deviation is 5.089. Overall, the students who were tested had a positive perception of the e-module that had been made.

The steps taken by the researcher to find out the comparison between class and gender perceptions is to use a prerequisite test. The prerequisite test was carried out using the normality test and homogeneity test. The normality test is carried out to test whether a series of observations comes from some fully defined continuous distribution or the data is normally distributed (Das & Imon, 2016; Fillion, 2015; Kwak & Park, 2019; Lilliefors, 2017). To test for normality, it can be done using the Kolmogorov-Smirnov condition that if the significance value is > 0.05 then the data can be said to be normally distributed. Homogeneity test was carried out using Levene's test to see whether the data was homogeneous or not, if the value of Sig. greater than $\alpha = 0.05$, then it indicates that H_0 is acceptable so it can be concluded that the data variance is homogeneous (Fuad et al., 2017; Laurens et al., 2018; Tekedere & Göker, 2016). Based on the results that have been obtained, the normality test for perceptions for each class is 0,2. Meanwhile, for the homogeneity test, the value of Sig. Levene's Test for Equality of Variances is 0,576. With the normality and homogeneity test sig values greater than the requirement, namely 0.05, it can be concluded that the data is normally distributed and homogeneous. After the prerequisite test was met, the data was processed using descriptive statistics and hypothesis testing independent sample t-test. Independent sample t-test can be calculated using the formula or SPSS. The first thing to do under the variable view is to write the variable under test in the first column under the first row. Under the data view: In the data view we click analyze and then click compare mean. From compare mean we go to independent sample t-test. Under t-test input, move the score under test into the test variables box. Write the test score (population mean) into the test score box and finally click ok (Choudhary, 2018; Gerald, 2018). By comparing the significance, if the probability is > 0.05 , then the hypothesis (H_0) is rejected and if the probability is < 0.05 , the alternative hypothesis (H_a) is accepted (Agustina, 2018; Bhatti et al., 2019).

Based on previous research, there are usually significant differences in perceptions based on a person's gender, girls tend to follow the majority class and more competitive in choosing something while boys are more likely to prioritize personal concepts (Çera et al., 2018; Samuelsson & Samuelsson, 2016; Rizkiyah, Susanto, & Nugroho, 2016). From the research that the researcher has done on the students of class A and class C who have been grouped by gender, the results are the same as the previous research above. In addition to the above factors, this study is also in line with research conducted (Anggoro, 2016; Dilla, Hidayat, & Rohaeti, 2018; Darsini, Fahrurrozi, & Cahyono, 2019), where the results of this study state that men have higher perception values. higher than women, this is certainly closely related to biological factors in the human brain. Where as many know women use their emotions more often when facing or responding to something, while men are on the contrary where they are more inclined and more often use their minds or can be said to be more realistic. Based on the results that have been obtained, it is known that the perceived value tends to be good. With a good e-module assessment, it is hoped that in the future this e-module will help students understand Mathematics Physics learning. In addition, products that use Indonesian and make it simpler and easier to understand are expected to make students free in interpreting learning without worrying about misunderstandings in delivering or discussing material. In the long term, this e-module is believed to be able to improve the pedagogic abilities of Physics education students as future teacher candidates who are certainly required to have critical analytical and calculation skills. Pedagogic ability is a person's ability to teach which includes various aspects related to education, basic teaching skills and classroom management so that learning activities can run effectively to achieve educational goals (Alekhina et al., 2020; Indriani, 2016). To be able to improve pedagogic abilities, good and flexible learning media are needed, one of which is utilizing technological advances, namely in this study the e-module of Mathematics Physics I vector material.

For educators themselves, perception research like this is very useful in improving the quality of an educator in mastering the material and sharing knowledge with the students he teaches so that they can become professional educators (Mashuri, 2017; Widyastuti, Widiyaningrum, & Lisdiana, 2017; Lewis & Holloway, 2019). By getting good perceptions from students of the e-module product being tested, it can be said that this research also helps educators, especially lecturers in Mathematics Physics I, in seeing what kind of learning students like. This means that if students already like learning, good learning outcomes will follow. Then from the side of the Mathematics Physics course itself. E-modules that get good perception results will certainly help lecturers add complementary learning resources that are easy to understand and simple. So it is hoped that further research may be able to examine how students' perceptions are associated with high-level student thinking skills or student attitudes in studying Mathematics Physics using technological advances, namely e-modules, so that it will produce great benefits for students.

The student perception variable was used to increase the effectiveness of learning in the classroom and did not examine the relationship between the perceptions of first graders and other classes (Asrial et al., 2020; Darmaji, Kurniawan, et al., 2019; Serevina & Sari, 2018). As for other research have differences in the teaching materials used as the contents of the e-module, namely in this study using learning materials in the Core Physics course (Pathoni et al., 2017), further research where the use of teaching materials in the e-module is kinetic gas

theory material using 3D Pageflip Professional (Putri et al., 2020), and the last one is in research where the perception itself only sees based on the perception of material and media experts without considering the perspectives of students by reviewing gender differences (Ramadhan et al., 2020). Previous research also only focused on students' perceptions of one class, while the research that the researcher did used more data. However, the research conducted has a weakness where the researcher does not explain specifically the product that is the object of student perception. In addition, the data processed is only limited to measuring the relationship between students' perceptions in the three classes and does not use other variables. Therefore, the researcher suggests that further research is expected to add variables such as students' higher-order thinking skills or students' attitudes towards the developed e-module so that it does not only measure the relationship but the influence between variables.

The use of e-modules can increase students' interest in learning mathematical physics. Students can learn mathematical physics practically through smartphones that can be accessed anywhere and anytime. By working on the questions in the e-module, it can improve students' understanding abilities. This study shows that each student has their own perception in the use of media as technological advances in the field of education. The student's perception is influenced by gender. As a result, his research can be a guide for further research. The next researcher can conduct research on student perceptions of the mathematical physics e-module on student interest and motivation and student learning outcomes based on gender differences. Also, the further researchers can conduct research on student perceptions in the use of mathematical physics e-modules on students' critical thinking skills.

4. CONCLUSION

Based on the results when viewed by gender, there are significant differences perception between female and male students in each class. So that gender can be said to be one of the factors that influence differences in perception. The difference is seen after testing the assumptions and testing the hypothesis. Descriptions of student perceptions can be seen in descriptive data analysis, while differences in perceptions are seen based on the results of the t-test that has been carried out in each class by looking at the difference in average scores between male students and female students. The advantage of this research is to see students' perceptions of the e-module of mathematics physics I on partial differential material based on gender variables. The limitations of this study are only to see the differences in student perceptions. It is hoped that further researchers can conduct research on e-modules in broader fields such as critical thinking, high order thinking skills, interests, motivation, or others.

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