



The Difficulty Factors of Students to Understand Mathematics Physics 1 at Physics Education Department FKIP Unsyiah

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ABSTRACT

This study aims to determine the factors that cause college students to experience difficulty in understanding Mathematics Physics I lectures and any material/subject from Mathematics Physics I subjects that college students experience difficulties. This research uses a qualitative approach. The subjects in this study were college students of FKIP Unsyiah Department of Physics Education 2017 with a population of 50 people . Data collection techniques through questionnaires (questionnaire) and interviews. The results of the study concluded that college student factors, KBM factors, and learning facility factors did not cause college students to experience difficulties in understanding Mathematics Physics I lectures and overall Mathematics Physics I material / subjects were less difficult for college students to understand.

Keywords: skills test, student, basic physics measurement tool, assessment rubric

INTRODUCTION

Physics is a science that deals with the discovery and fundamental understanding of the laws that move matter, energy, space and time. Physics includes the elementary constituents of the universe and its fundamental interactions, as is the analysis of systems that are most understandable in terms of these fundamental principles. According to history, Physics is the oldest science in science. Because it starts with observations of the movements of celestial bodies, their trajectories, their period and their age. This field of science began centuries ago and developed in the times of Galileo and Newton.

In modern times like today, physics supports technology, industry, communication, engineering, chemistry, biology, medicine, and others. Therefore, physics is needed in daily life as well as the progress of science and technology. Thus, Physics has begun to be studied from Middle School to Higher Education.

Physics Education is one of the departments in the Teaching and Education Faculty (FKIP) of Syiah Kuala University. The education system implemented in the Department of Physics Education takes the form of a Semester Credit System (SKS), which is that each course that is attended by college student describes the amount of burden that must be completed by college students of the Department of Physics Education. There are many courses at the Department of Physics Education, one of them is Mathematics Physics I.

Mathematics Physics I is a course that teaches the basic concepts of Mathematics needed to perform various calculations and reasoning in advanced Physics courses. The purpose of studying Mathematics Physics I according to Nathanael (2010), "The purpose of learning Mathematics Physics I is to practice the use of Mathematics which is very useful in Physics, without understanding Math is difficult to understand many things in more advanced physics courses".

Mathematics Physics I is a subject that is classified as complicated and has a high difficulty because students must master lectures in Calculus, Basic Physics I, and Basic Physics II which are prerequisites of the Mathematics I course. Some results of the previous studies indicate that difficulty of the Mathematics Physics I course causes low learning outcomes (Farmaryanti, 2010; Mundilarto, 2006; Ifda, 2016). The expected learning outcomes in this course are college students are able to apply the mathematical concepts to solve various physics problems. However, these learning achievements have not been reached to the fullest. (Gunada, et al, 2017: 216-217).

Problem of Research

In its implementation, this course is considered difficult by students of the major of Physics Education. In addition to not mastering the basic concepts of mathematics, college students tend to be inactive and slow in accepting the material being taught. College students are only active if they are directed to the front of the class to work on question, if they are not appointed to come forward there are no college students working on the question. In addition, the study results obtained by college students are not satisfactory so that college students get low grades and some even re-contract this course because they do not graduate. So that the achievements pembe disable in on this course was not a chieved as it should be.

Research Focus

The focus of this research is to identify the material/subject matter of the Mathematical Physics I course that college students are having difficulty. And to find out the factors that cause college students to experience difficulty in understanding Mathematics Physics I lectures.

METHODOLOGY OF RESEARCH

General Background of Research

This study uses a qualitative approach because it produces descriptive data in the form of speech, writing, and the behavior of the people observed. This is in agreement with Margono (2010: 36) "Qualitative research is a research procedure that produces descriptive data in the form of written or oral words from people and observed behavior".

This type of research is deskriptive because describe factors experienced by students of major of Physics Education FKIP Unsyiah in understanding the lecture material in any of Mathematical Physics 1 without making any changes, additions or fact to the data.

Sample of Research

The subjects in this study were FKIP Unsyiah Department of Physics Education class of 2017 who had taken Matfis 1 lecture in the odd semester of the 2018/2019 school year with a population of 50 people.

Instrument and Procedures

To obtain data about the factors that cause difficulties in understanding Mathematics Physics I lectures that are experienced by students of the Department of Physics Education FKIP Unsyiah, obtained through written interviews using a questionnaire . Questionnaires were used in the study this was a questionnaire enclosed. Closed questionnaire is a questionnaire which provides an alternative answer to the question a tau statement is given, so that the respondents do not have the freedom to answer questions at au statement outside alternative answers provided in the questionnaire. (Walgito, 1999: 35-37).

Data Analysis

The data analysis technique uses the difficulty criteria in the following table:

Table 1. Difficult Criteria and Factors Cause of Difficulties in Understanding Physic Mathematics Material 1.

Number of Respodent Answer Scores	Difficult Criteria	Criteria Factors Cause
151-200	Not difficult	No becomes a factor difficulty
101-150	Less difficult	Less becomes a factor difficulty
51-100	Difficult	Being factor difficulty
0-50	Very difficult	Very becomes factor difficulty

(Source: Sugiyono, 2010: 137)

RESULTS AND DISCUSSION

After all the data collected obtained from sources extracted from questionnaires and interviews then processed. To facilitate the data processing that has been obtained from the respondent, the data is tabulated according to respondents answer in the questionnaire into the following table this :

Table 2. Factors Students of the Department of Education Physics Education FKIP Unsyiah had difficulty in understanding Matfis I lecture material.

No	Questions	Very	Agree	Less	Not	Total score
1	I do not understand the basic concepts of	-	8 (16)	35 (105)	7 (28)	149
2	I don't want to train or do the questions Lecturer	-	3 (6)	28 (84)	19 (76)	166
3	I am not trying to train or work on physics problems from literature books using mathematical concepts	-	4 (8)	33 (99)	13 (52)	159
4	In lectures I rarely ask questions and tend to rely	-	11 (22)	25 (75)	14 (56)	153
5	I do not use textbooks and hang material from lecturer powerpoints	-	1 (2)	29 (87)	20 (80)	169
6	I do not want to learn independently to find that support the course material	-	3 (6)	30 (90)	17 (68)	164
7	I was not enthusiastic about attending	-	1 (2)	24 (72)	25 (100)	174
8	I was sleepy at the time of KBM so I was less concentrated in attending lectures	-	2 (4)	30 (90)	18 (27)	166
9	I rarely attend class when KBM is in class	-	-	9 (27)	41 (164)	191
Total Average Score						166

Overall the average scores obtained in Table 2 is 166 , based on Table 3, the total score includes the criteria did not become a factor causing difficulties. This means that in the study of college students factors does not cause college students to experience difficulties in understanding the material lectures Mathematics Physics 1.

Table 3. Factors of Teaching and Learning Activities (KBM) in Lecture of Mathematics Physics

No.	Questions	Very Agree	Agree	Less Agree	Not Agree	Total Score
10	In lecturing mathematics physics I, lecturers do not provide or explain examples of problems that apply mathematical concepts to solve physics problems	-	-	10 (30)	40 (80)	110
11	Lecturers do not give assignments to solve physics problems that apply mathematical concepts	-	-	12 (36)	38 (152)	188
12	The method of teaching lecturers makes me bored studying	-	4 (8)	34 (102)	12 (48)	158
13	Lecturers are often absent during teaching and learning activities	-	11 (22)	25 (75)	14 (56)	153
14	Lecturers do not use learning materials	-	-	6 (18)	44 (176)	194
15	Lecturers use learning media that is less supportive of learning material	2 (2)	3 (6)	24 (72)	21 (84)	164
Total Average Score						161

Overall the average number of scores obtained in Table 3 is 161 , which does not cause college students to have difficulty in understanding the material lectures Mathematics Physics I.

Table 4. Factors of Learning Facilities in Lecture Mathematics Physics I.

No.	Questions	Very Agree	Agree	Less Agree	Not Agree	Total Score
16	Classroom lighting during KBM is not good	1 (1)	3 (6)	24 (72)	22 (88)	167
17	Hot classrooms make learning uncomfortable	14 (14)	10 (20)	21 (63)	5 (20)	117
18	The tables and chairs used at the time of the KBM were not adequate and adequate	-	7 (14)	26 (78)	17 (68)	160
19	Learning time during the day made me concentrate less	6 (6)	12 (24)	30 (90)	2 (8)	128
20	The availability of modules, textbooks and references that support the course material is still lacking	-	7 (14)	32 (96)	11 (44)	154
Total Average Score						145

Overall the average number of scores obtained in Table 4 is 145 , based on Table 2.1, the total score includes the criteria of being less a factor causing difficulties. This means that in this study the learning facility factor is less causing college students to have difficulty in understanding Mathematics Physics I lecture material.

Table 5. Content Eyes Lecture Matfis I.

No	Subject	Very Difficult	Difficult	Less Difficult	Not Hard	Total Score
1	Row	-	8 (16)	35 (105)	7 (28)	149
2	Complex numbers	-	12 (24)	35 (105)	3 (12)	141
3	Vector basics	1 (1)	10 (20)	35 (105)	4 (16)	142
4	Determinant matrix and system of linear equations	2 (2)	8 (16)	28 (84)	12 (48)	150
5	Partial differential	4 (4)	23 (46)	19 (57)	4 (16)	123
6	Linear differential equation	9 (9)	20 (40)	18 (54)	3 (12)	115
Total Average Score						137

In this study, based on the results of the questionnaire, the average student score was 161 (Table 3). Based on Table 4, the total score included in the criteria did not become a factor causing the difficulty. This means that in this study the college student factor did not cause students to experience difficulties in understanding Mathematics Physics I lecture material. The KBM factor obtained an average score of 161 (Table 3). Based on Table 2, the total score also includes the criteria not to be a factor causing difficulties. This means that the KBM factor in Mathematics Physics I lectures does not cause college students to experience difficulties in understanding Mathematics Physics I lecture material. Whereas the factor of learning facilities in Mathematics Physics I lectures is obtained an average score of 145 (Table 4). Based on Table 2, the total score included in the criteria is less a factor causing difficulties. This means that the learning facility factors in Mathematics I lectures less cause college students to have difficulty in understanding Mathematics Physics I. lecture material. So, overall these factors do not cause college students to have difficulty in understanding Mathematics Physics I lecture material.

The main cause of students' difficulties in understanding Mathematics Physics I lecture material is the low level of student learning activities, both in asking questions, raising opinions, working on assignments lecturers by lecturers as well as the questions in the lecture handbook. Lectures are only dominated by lecturers while students are only waiting for an explanation from the lecturer. (Fatmaryanti & Siska, 2014: 19).

Difficulties of students in the Mathematics I course are caused by the behavior of students in attending mathematics physics 1 courses, including: 1) students who do not want to train themselves to work on questions in books, 2) students tend to rely on lecturer explanations, 3) students only use one textbooks and hang material from powerpoints and lecturers, and 4) the behavior of students who do not want to study

independently looking for references that support mathematics physics 1 courses (Gunada, et al, 2017: 216-217).

Factors that cause difficulty learning among others: Methods of teaching (Slameto, 2015: 67), instrument lessons (Slameto, 2015: 65), the time to learn (Slameto, 2015: 68), lighting (Hasbullah Thabrany, 1994: 48), a place to sit and the table board (Farida, 2017: 60; Oka, 2017: 17-18), and material resource (Yani, 2012: 23).

Whereas in Mathematics Physics I lecture material, based on questionnaire result data, in the series material obtained a total score of 149 (Table 3.4). Based on Table 4, the total score includes the less difficult criteria. This means that college students are less difficult in understanding the material. In the complex number material obtained a total score of 145 (Table 4). Based on Table 2, the total score includes the less difficult criteria. On the basis of the vector basic elements, the total score is 142 (Table 3.4). Based on Table 2.1, the total score includes the less difficult criteria. This means that college students are less difficult in understanding the material. In the determinant matrix material and the system of linear equations i get a total score of 150 (Table 3.4). Based on Table 2.1, the total score includes the less difficult criteria. This means that college students are less difficult in understanding the material. In the partial differential material, a total score of 123 was obtained (Table 3.4). Based on Table 2.1, the total score includes the less difficult criteria. This means that college students are less difficult in understanding the material. Whereas in the matter of linear differential equations obtained a total score of 115 (Table 3.4). Based on Table 2.1, the total score includes the less difficult criteria. This means that college students are less difficult in understanding the material.

Based on the results of Mundilarto's research (2002: 1) there are several types of college student difficulties in mathematics physics courses, among others:

1. in interpreting physical concepts appropriately,
2. in applying the concepts and principles of physics to solve problems,
3. in understanding mathematical concepts,
4. in applying mathematical concepts to create formulation models that are used for solving physics problems.

Overall the material/subject matter of Mathematics Physics I is less difficult for college students to understand. Based on the interview results, it is found that what makes it difficult for college students to understand Mathematics Physics I lecture material is the learning facility factor where tables and chairs are less neatly arranged in class so as to make them less comfortable in learning in class. This is in accordance with the statement of respondent 8: "When we learn in class, the table is less neatly arranged, the chairs are lined up without any spaces".

Also because it is not accustomed to or practicing working on problems that use the application or application of physical concepts. This is in line with respondent 9: "The material is difficult, difficult to understand, because there are many applications or applications in it". And also college students lack understanding of concepts from basic mathematics. Respondent 4 stated, "The material is difficult to understand, because of lacking mathematical ability". This is supported by respondent 1: "The material is difficult to understand because the basic mathematical abilities are lacking".

Then college students are not able to understand or capture the material explained by the lecturer. Respondent 2 stated, "The material is interesting, good but difficult to understand, when you explain we don't understand, when studying at home we often ask friends". This is in line with respondent 6: "The lecturer teaches well but we cannot catch the material he explained, do not know what is taught". And also supported by respondent 7: "We do not understand the material taught by lecturers".

And the method of teaching lecturers is not interesting so it makes students bored studying and difficult to understand lecturer material. Respondent 4 states, "The way the lecturer is less attractive". The same thing with respondent's statement 5: "Lecturers teach less interesting". Last time studying during the day so that makes students less concentrated. This is in line with respondent 10: "Hours of teaching during the day, sometimes makes us less concentrated".

CONCLUSIONS

Based on the results of the research conducted, it can be concluded that overall college student factors, KBM factors and learning facility factors do not cause college students to experience difficulties in understanding Mathematics Physics I lecture material. Overall material/subject matter Mathematics Physics I is less difficult for students to understand.

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