Improving Students' Activities and Mathematics Achievement Using Fractions E-Module in Distance Learning during the Covid-19 Pandemic

*Putri Dwi Suarni[1]

[1] *SMAN 8 Bulukumba*
Email: putriblk2017@gmail.com

ABSTRACT

This research aimed to improve students' activities and achievements using fractions E-module in distance education during the Covid-19 pandemic. The subjects of this research were the students of IVB class in the second semester of the 2020/2021 academic year from Terang-Terang 2 Bulukumba Elementary School. The subjects were 30 students, which consisted of 18 male students and 12 female students. The research was conducted through two periods, with three meetings on each period. The data were taken using achievement tests and observation sheets and analyzed using qualitative and quantitative analysis. The research findings of E-module usage showed that: (1) On the first period, the students' average score was 90 with 12,034 deviation standards from the ideal score, 100. While on the second period, the students' average score was 94, with 6,288 from the ideal score, 100. (2) Students' attention, motivation, interest, and confidence increased in learning mathematics, and the students can also conduct individual learning. It could be concluded that E-module application as a mathematics learning method can increase students' activities and achievements in IVB class of Terang-Terang 2 Bulukumba Elementary School.

Keywords: *Activity, Achievement, Fractions, E-module, Distance learning.*

1. INTRODUCTION

Education in Indonesia is a unique characterized-based education in line with Indonesian cultures and the century's skill demands. The 21st century is a technology and knowledge-based century, so it requires human resources from a country to master various skills such as critical thinking, creativity, collaboration, and communication in terms of the learning process.

Education dramatically influences human life to boost a country, and it is a primary point in the education world as an establishment and development process multidimensionally, especially towards mathematics. Mathematics is a thinking medium to study logically, critically, rationally, and systematically and a medium for students to exercise their skills to solve problems around them.

Mathematics is a subject having an essential role in determining someone's future. A common problem about mathematics now is that mathematics is one of the subjects that are often to be complained by students caused by some factors namely monotonous class, having no ice-breaking during the course, teachers who still use traditional ways in teaching, lesson books, and teacher's mindset that are not compatible with the current curriculum.

Challenges faced by teachers nowadays are that they need to develop creativity, attitude, exemplary, and innovation in designing a lesson. The existence of mathematics teaching pattern changes in the previous era should be done by teachers nowadays. If mathematics education in the revolution 3.0 era was still dominated by teaching tools usage, hence in revolution 4.0 era should be overwhelmed by the implementation of software applications.

Throughout the 4.0 revolution era, technology, information, and communication have been applied massively in daily life. Learning method in school also needs to be adapted, and innovation in learning method is highly required. It is time for the teacher to avoid the learning process, which only relies on memorizing and finding the correct answer. It is important because Mathematics is an abstract subject, and it needs concepts comprehension. The learning method should become visionary in terms of creative and innovative thinking. Therefore, combining mathematics with classical and digital learning is necessary to face the 4.0 revolution era. However, technology would never replace the role of teacher and lecturer and the learning interaction between teacher and student because education is not merely gaining knowledge but also gaining scores, teamwork, and competence. Learning technology is not about the technology itself, but the main point is how the technology is applied appropriately in helping the student to understand.

During mathematics learning in the recent globalization era, technology utilization is very much needed to develop mathematics learning media. Teachers in the 4.0 era should use technology correctly, such as producing unique animation learning videos or mathematics games that attract students' interest in learning mathematics. According to Kaushik Das [1], the whole world is in the middle of the COVID-19 pandemic situation, and all stages of education belong to a crisis period. This is the time to adopt new technologies simply. However, it also means giving up on certain attitudes about what constitutes educational achievement. The main focus for this COVID-19 pandemic issue is the evolution and change of the classroom with the developing integration of the internet and interactive digital gadgets into mathematics teaching and teacher education.

During the Covid-19 pandemic, the Indonesian Ministry of Education, Culture, Research, and Technology had released policy. It changed Learning-Teaching Activity (KBM) by using an online system (Daring), Distance Education (PJJ), and Learning from Home (BDR). A covid-19 pandemic causes the learning process in-home (Daring) to become ineffective, so teachers need to be creative and innovative in establishing teaching media so students would not be bored in undergoing online learning. Anticipating the transmission of the virus, the government has issued various policies, from isolation, social and physical distancing to Large-Scale Social Restrictions (PSBB). This condition requires citizens to stay at home, work, worship, and study at home [2].

Hence, exciting learning media is needed to motivate students in learning, and one of the examples is E-Module. According to Rahmi [3], E-Module is self-learning media in the form of digital, having purposed to actualize preferred learning competence and make students more interactive by using the application. According to Asmiyunda [4], E- module is teaching the material in the form of a module displayed in an electronic format that is expected to increase students' interest and motivation to learn. This statement is in line with Kemendikbud [5], which stated that E-Module usage encourages effectivity and quality of learning, expands teacher and student's material comprehension, and becomes a solution for students' self-learning. Moreover, E-Module's attractive appearance is expected to increase students' motivation, interest, confidence, and learning activity, which improves students' scores. Based on research that has been done, Suyoso [6] states that the use of e-modules has been shown to increase achievement and obtain positive student responses. Based on the statements above, the writer is interested in researching the application of the E-Module entitled "Improving Students' Activities and Mathematics Achievement Using Fractions E-Module in Distance Learning during the Covid-19 Pandemic".

2. RESEARCH METHOD

This research is a Classroom Action Research consisting of two cycles, and every process consists of four phases: Planning, Observing, Action, and Reflecting. The subjects of this research were 30 students from IVB class which consisted of 18 male students and 12 female students from Terang-Terang 2 Bulukumba Elementary School.
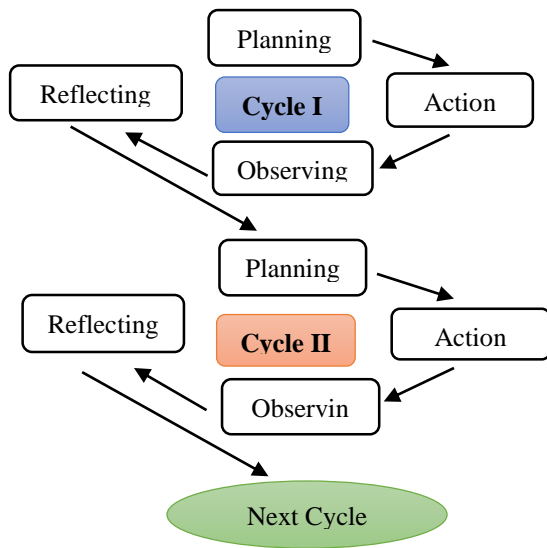
Figure 1. PTK Implementation Cycle

Cycle 1:

1. Planning is the preparation conducted by the writer to execute the research, which consists of:

   1) Preparing compatible learning device with curriculum applied in school consisting of syllabus and RPP.

   2) Preparing Fractions E-Module, which will be given to students during the learning process.

   3) Producing instruments that will be used in research.

2. Action is the action implementation during the learning process. In this phase, the teacher is the doer and conducts the learning process based on RPP made by the writer.

3. Observing is the data recording procedure about process and product from the established action implementation. In this phase, observation is done on the teacher's teaching activity and student's learning activity during the learning process.

4. Reflecting is the activity of reporting things that have been done and planned for the next cycle to improve inappropriate or incompatible activity.

Cycle 2:

1. Planning

   The researcher makes a learning plan based on reflecting on the result of the first cycle.

2. Action

The teacher conducts a learning process based on the learning plan established by the researcher based on reflecting results on the first cycle.

3. Observing

   Observation is conducted to teacher's teaching activity and student's learning activity during the learning process by the researcher's associate.

4. Reflecting

   Discussing the implementation of the second cycle alongside other mathematics teachers and students.

2.1. Instruments and Data Collecting Technique

Research Instrument is the tool used to find and collect data during the research. In this research, the instrument used were the teacher activity observation sheet and student activity observation sheet. Teacher activity observation consisting 11 observation aspects that were used to observe teacher's activities during the learning process. The student activity observation sheet consisted of 10 observation aspects used to observe students' activities during the learning process. A test sheet was used to measure students' competence following online mathematics learning at the end of the cycle.

2.2. Data Analysis Technique

Two data groups would be analyzed:

1. Data of teacher's activities observation and students' activities observation were analyzed using percentage technique (P):

$$P = \frac{number\ of\ students'\ activities}{total\ number\ of\ students\ \ activities} \times 100\%$$

According to Arikunto [7], learning activity interpretation is shown in table 1 below

Table 1. Learning Activities Interpretation

Learning Activities Percentage	Category
$0\% \leq P < 20\%$	Borderline
$21\% \leq P < 40\%$	Below Average
$41\% \leq P < 60\%$	Average
$61\% \leq P < 80\%$	Above Average
$81\% \leq P < 100\%$	Excellent

2. Data of students' achievements were analyzed by using the percentage technique and criteria of

individual learning passes. The minimum Mastery Criteria (KKM) used was 70. A student was categorized into passing KKM if the score fulfilled KKM. Passing percentage could be analyzed with the formula:

$$NI = \frac{T}{SM} \times 100\%$$

NI = Individual passing score

T = Score obtained by students

SM = Maximum score of the test

Table 2. Standardized Categorization Technique based National Education Department Categorization

No.	Material Comprehension Level (Percentage)	Category
1	90 – 100	Very High
2	80 – 89	High
3	65 – 79	Average
4	55 – 64	Low
5	0 - 54	Very Low

Data on this research were processed quantitatively and qualitatively. Descriptive analysis was used to analyze data quantitatively using the average score and passing percentage based on the SPSS 20 program. On the other hand, the data were analyzed qualitatively by scoring students' activities.

3. RESEARCH FINDINGS

3.1. Students' Achievements Descriptive Analysis

Quantitative Data on this research was data of mathematics achievement obtained from mathematics achievements test. A descriptive score of students' mathematics achievements can be seen in table 3.

Table 3. Students' mathematics achievements statistics score on Cycle I and Cycle II

Statistics	Statistics Score	
	Cycle I	Cycle II
Subject	30	30
Ideal Score	100	100
Highest Score	100	100
Lowest Score	55	80
Range Score	45	20
Average Score	90	94,67
Deviation Standard	12,034	6,288

Based on Table 3, students' mathematics achievements average score on IVB class after the first cycle was 90 from ideal score 100, which might be gained by students with a deviation standard 12, 03. Obtained score by students from the lowest score with 55 and 100 as the highest score with range score 45. Meanwhile, students' mathematics achievements average score after the second cycle was 94,67 with a deviation standard of 6,29. Students' mathematics achievements scores were categorized into five categories based on the Department of Education and Culture qualification below.

Table 4. Percentage and frequency distribution of mathematics achievements score on Cycle I and Cycle II

Score	Category	Frequency		Percentage (%)	
		Cycle I	Cycle II	Cycle I	Cycle II
90 – 100	Very High	17	27	57	90
80 – 89	High	9	3	30	10
65 – 79	Average	3	0	10	0
55 – 64	Low	1	0	3	0
0 – 54	Very Low	0	0	0	0

Quantitative descriptive percentage on students' mathematics learning passing about fractions after the application of E-module as distance learning media could be seen on the table below.

Table 5. Students' learning passing description on class IVB Terang-Terang 2 Bulukumba Elementary School on Cycle I and Cycle II

Score	Kategori	Frequency		Percentage (%)	
		Cycle I	Cycle II	Cycle I	Cycle II
0 – 69	Did not pass	2	-	7	-
70-100	Pass	28	30	93	100
Total		30	30	100	100

To find a precise comparison about students' comprehension level based on Tables 3 and 4 in solving fraction mathematics-problems on Cycle I and Cycle II are explained in the table below:

Table 6. Comparison students' comprehension scores on Cycle I and Cycle II

No	Cycle	Score		
		High	Low	Average
1	Cycle I	100	55	90
2	Cycle II	100	80	94,67

Table 6 showed that students' comprehension average score in solving fraction mathematics problems increased based on Cycle I final score result 90 became 94,67 on Cycle II.

3.2. Students' Activities During Learning Process

The observer did observation results to students during Cycle I showed that total number starting from the first meeting until the final test on Cycle I based on questionnaire shared through Google Form, students were encouraged and participated actively in solving mathematics questions in E-Module even though some problems needed to be perfected on the next meeting. One of the problems was when the teacher started class, some students had joined the course because of connection problems, and some students were hardly accessed E-Module because of connection problems. After applying Cycle II, there were changes in students' attitudes, motivation, and confidence during the learning process. There were no longer students who came late and could not access E-Module on Cycle II. Students' activities increased from 60% on Cycle I became 90% on Cycle II.

The questionnaire result showed that students were enthusiastic and encouraged in following the class because of the exciting E-Module design, understandable material, clear illustration pictures, easy and exciting LKPD materials, and understandable language. One of the factors determining the success of Cycle II was that the researcher motivated students to become more serious in listening to mathematics lessons and ensure full self-awareness in learning mathematic.

3.3. Teacher's Activities During Learning Process

Research results were obtained from other teacher observations by filling observation sheet prepared by the researcher to evaluate the online learning process. The observation results on Cycle I showed some lacks made by the researcher from the first meeting until the final test on Cycle I. The lack was that the researcher did not use time maximally and did not conclude at the end of the meeting. The teacher's activity increased on the second cycle, which could be seen from the improvement made based on Cycle I. The improvements were that the researcher started the class on time and concluded at the end of class.

4. CONCLUSION

Based on research and discussion, it could be concluded that students' mathematics learning process using E-Module as learning media was optimal based on achievement and students' activity in online learning. Based on achievements, the average test score increased from 90 on cycle I became 94,67 on cycle II. Based on students' activity observation sheets during the learning process, students' activities increased from 60% on cycle I became 90% on cycle II. This showed that E-Module usage in the learning activity during the Covid-19 pandemic could improve students' interaction and dominant role in the learning process, so the students became more active in class. Using E-Module in fraction material could increase students' activity and interests so the students could be interested, happy, and encouraged in learning mathematics.

REFERENCES

[1] Kaushik Das, 2020. Integrating *E-learning & Technology in Mathematics Education. Journal of Information and Computational Science*. 310.

[2] Jamaluddin, D., Ratnasih, T., Gunawan, H., & Paujiah, E, 2020. Pembelajaran daring masa pandemik Covid-19 pada calon guru: Hambatan, solusi dan proyeksi. In Karya Tulis Ilmiah UIN Sunan Gunung Djati Bandung. http://digilib.uinsgd.ac.id/30518/

[3] Rahmi, L, 2018. *Perancangan E-module Perakitan dan Instalasi Personal Komputer Sebagai Media Pembelajaran Siswa SMK*. 21(1), 105-111

[4] Asmiyunda and F. Azra, 2018. "Pengembangan e-modul kesetimbangan kimia berbasis pendekatan saintifik untuk kelas XI SMA/MA, Jurnal Eksakta Pendidikan, vol. 2, pp. 155-161, November 2018.

[5] Kemendikbud, 2017. *Panduan Praktis Penyusunan E-Modul*. Jakarta: Kemendikbud RI

[6] Suyoso and S. Nurohman, 2014. "Pengembangan modul elektronik berbasis web sebagai media pembelajaran fisika," Jurnal Kependidikan, vol. 1, pp. 73-82, 2014.

[7] Arikunto, 2010. *Prosedur Penelitian*. PT. Rineka Cipta. Jakarta