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Interactive Learning Media using Adobe Animate CC to Improve Students' Learning Motivation and Mathematics Learning Outcomes

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Abstract: This study aims to apply digital learning media in the form of Adobe Animate CC in learning mathematics. This research is a quantitative research with a comparative approach to compare learning outcomes based on the application of interactive learning media Adobe Animate CC. The research population was all junior high schools in Bengkalis Regency, while the sample was a portion of the schools taken purposively according to the purpose of the research. The data collection tool is a learning achievement test and a checklist to observe student learning motivation in class while studying with Adobe Animate CC. Data analysis in this study used descriptive statistics, t-test and One Way Anova. The results of the analysis show that there are significant differences in student learning outcomes in the experimental class using Adobe Animate CC learning media and the control class using conventional learning. There were significant differences in learning motivation in the experimental class at the first meeting, second meeting, third meeting and fourth meeting. Adobe Animate CC learning media can improve learning outcomes and motivation of junior high school students in Bengkalis Regency, Riau Province.

Keywords: digital learning media, learning outcomes, learning motivation.

Abstrak: *Penelitian ini bertujuan untuk menerapkan media pembelajaran digital berupa Adobe Animate CC dalam pembelajaran matematika. Penelitian ini merupakan penelitian kuantitatif dengan pendekatan komparasi untuk membandingkan hasil belajar berdasarkan penerapan media pembelajaran interaktif Adobe Animate CC. Populasi penelitian adalah seluruh sekolah menengah pertama di Kabupaten Bengkalis sedangkan sampel adalah sebagian sekolah yang diambil secara purposive sesuai dengan tujuan dilaksanakan penelitian. Alat pengumpulan data adalah dengan tes hasil belajar dan daftar checklist untuk mengamati motvasi belajar siswa di kelas selama belajar dengan Adobe Animate CC. Analisis data dalam penelitian ini menggunakan statistik deskriptif, t-test dan One Way Anova. Hasil analisis menunjukkan bahwa terdapat perbedaan signifikan hasil belajar siswa pada kelas eksperimen menggunakan media pembelajaran Adobe Animate CC dengan kelas kontrol menggunakan pembelajaran konvensional. Terdapat perbedaan signifikan motivasi belajar pada kelas eksperimen pada pertemuan pertema, pertemuan kedua, pertemuan ketiga dan pertemuan keempat. Media pembelajaran Adobe Animate CC dapat meningkatkan hasil belajar dan motivasi siswa sekolah menengah pertama di Kabupaten Bengkalis Provinsi Riau.*

Kata kunci: *media pembelajaran digital, hasil belajar, motivasi belajar.*

▪ INTRODUCTION

Technological developments have affected aspects of human life, especially in the field of education. Education at this time is more directed at the 4.0 revolution era where learning activities can be linked to technology. This is because the current generation cannot be separated from technology. The role of technology is very important, especially for people in developing countries (Novita & Harahap, 2020). Therefore, there is a need for harmony between humans and information technology in

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education 4.0 with the aim of finding solutions to solving various problems that arise by creating opportunities that are creative and innovative (Alhadabi et al., 2019). The existence of technology is also able to make the scope of learning of students and teachers unlimited, this is due to the application of technology in teaching and learning activities so that learning can be done anywhere, still with the guidance of the teacher which aims to make students become more independent in solving problems (Muthoharoh & Sakti, 2021). One of the challenges experienced by educators in learning is that not a few students use gadgets (mobile phones) while learning is in progress, be it to open social media or to play games. For an educator, technological knowledge is a competency that must be mastered, this aims to support improvements in the learning process (Centauri, 2019).

Learning mathematics that is less varied will make it difficult for students in their development, especially in thinking creatively (Rachmawati, Baiduri, & Effendi, 2020). The solution that can be done to overcome this problem is to combine innovative learning models with the application of learning media that better support the learning process (Fitra & Maksum, 2021). With advances in information and communication technology, in providing subject matter teachers are required to be able to follow these progress (Nurrita, 2018). Teachers are required to have skills in creating a conducive learning atmosphere creatively and innovatively by using interesting learning media so that students can understand learning material so that learning objectives can be achieved (Cahyani, Listiana, & Larasati, 2020). Teachers must also be creative in planning interesting learning models both in terms of teaching, giving assignments and assessing (Chan, Maneewan, & Koul, 2021). One of the classroom conditioning that can be done by the teacher is by using learning media that is in accordance with teaching material which can affect students' ability to grasp the knowledge conveyed by the teacher (Hidayati, 2021).

In a digital era like today, students tend to prefer learning related to technology, so teachers need to be equipped with the ability to create interactive learning media (Sari, Novitasari, & Miftah, 2020). This is reinforced by the statement expressed by (Suharti, 2021) where Information Technology (IT) in the world of education is needed to support learning activities so that it makes it easier to achieve learning goals, namely by using internet-based learning media or e-learning. Interactive learning media can make it easier for teachers to create an interesting learning atmosphere so that they can provide motivation to learn so that the learning process can run efficiently (Devega & Suri, 2019). Learning media is one of the important things to be able to provide educational services to students so they can learn independently (Hennebry & Gao, 2021). Innovative and creative learning media can attract students' interest in participating in learning. This of course can provide motivation to students during learning takes place. Motivation is one of the factors that can affect learning outcomes. This is because with motivation, someone will have enthusiasm in achieving goals. Therefore, motivation is very important in arousing student learning enthusiasm so that teaching and learning activities can run well (Nizaar, Muhardini, & Mariyati, 2022).

▪ METHOD

This research is a quantitative research to see whether there is an influence of Adobe Animate learning media that has been developed on motivation and learning

outcomes. Products that have been developed and declared valid by experts and practitioners are then tested in schools to test the effectiveness of the program. The research design used in this research is an experimental research design with a post-test design approach proposed by (Sugiyono, 2016) which can be seen in Figure 1.

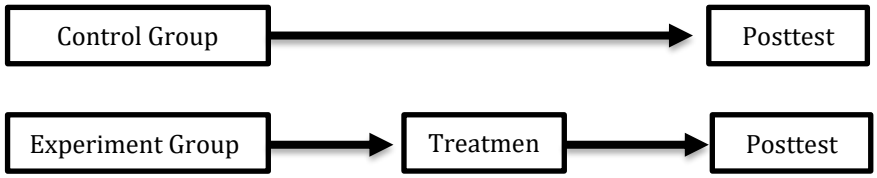

Figure 1. Research design

The subjects of the implementation of Adobe Animate digital learning media were 32 students in the control class and the experimental class. The Adobe animate learning program that has been developed and declared valid and practical by experts and practitioners was applied in the experiment in four meetings, while in the control class with conventional learning in four meetings. Both classes are classes with the same abilities so that the comparison of the experimental class and the control class can be maximized.

Data collection techniques in this study are observation and tests. Observations are used to see the motivation to learn mathematics which consists of 5 indicators, namely; 1) Perseverance in Learning, 2) Tenacity in Facing Difficulties, 3) Sharp Attention in Learning, 4) Achievement in Learning, 5) Independent in Learning with a total of 18 instrument items. The observation sheet has been declared valid by experts through the validity of the content analyzed by Aiken. Of the 23 items developed, only 18 items were recommended by experts for use in research. Observations were used to see if there were differences in motivation between the first meeting and meeting 4 while tests were used to see students' success in answering the test questions given after participating in the learning process for four meetings. The test used is 5 items which are also validated by content by experts. The five items recommended by experts can be used to obtain information on student learning outcomes. Data analysis in this study was descriptive quantitative, t-test, 1 way ANOVA. The data obtained from the results of the 32 experiments in the control class and experimental class will be described by descriptive statistics, t-test, and one way ANOVA.

▪ RESULT AND DISSCUSSION

The results of the research discuss the results of data analysis which starts with the data normality test to test whether the data is normally distributed or not, the One Way Anova test to see whether there are differences in learning outcomes from meeting 1, meeting 2, meeting 3, and meeting 4 from the use of guided interactive learning media Adobe Animate CC in increasing learning motivation. Furthermore, it can also be seen the results of the Post Hoc analysis to see what the differences are from each meeting 1, with meeting 2, meeting 3, and meeting 4. Meeting 2, with meeting 1, meeting 3, and meeting 4. Meeting 3, with meeting 1, meeting 2 and meeting 4. Meeting 4 with meeting 1, meeting 2, and meeting 4.

Normality analysis

Normality of data to see whether the data is normally distributed or vice versa. Knowing the data is normally distributed is important because the normality of the data determines what statistics will be used to analyze the data. Normal or not the data can be seen in the significant part. Then compare the results on a significant value with alpha (0.05) with the criterion if the significant value is greater than alpha (0.05), then the data is normally distributed. The results of the analysis can be seen in Table 1.

Tabel 1. One-sample kolmogorov-smirnov test

		Control	**Experiment**
N		32	32
Normal Parameters[a]	Mean	63.0938	77.0625
	Std. Deviation	8.86952	5.18022
Most Extreme Differences	Absolute	.101	.173
	Positive	.101	.129
	Negative	-.091	-.173
Kolmogorov-Smirnov Z		.569	.981
Asymp. Sig. (2-tailed)		.902	.290

From the results of the analysis, the Asymp value is obtained. Sig. (2-tailed) for the control class and the experimental class, meeting 3 and meeting 4 respectively were 0.902 and 0.290. From the results of this analysis it can be compared that the value of all data is greater than alpha (0.05). The conclusion from the normality analysis is that all data are normally distributed. To compare the control class and the experimental class, an independent t-test is proposed. Table 2 shows the results of the comparison of the experimental class and the control class.

T-test analysis

T-test is used to compare two groups or variables or aspects independently or dependently. The significance criterion is if the significant value is less than the alpha value, then there is a difference between the groups being compared. The results of the analysis of differences from the experimental class and the control class are described in Tables 2, 3, and 4.

Table 2. Descriptive statistics of learning results

	Group	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
Skor	Kontrol	32	75.4062	6.13220	1.08403
	Eksperiment	32	85.8125	5.67074	1.00245

Table 2 explains the results of the descriptive statistics from the results of the comparative analysis of the two classes, namely the experimental and control classes. From the results of the analysis of the control class, it was obtained an average of 75.41, a standard deviation of 6.13, with a standard error of 1.08. The experimental class

obtained an average of 85.81, a standard deviation of 5.67, with a standard error of 1.002. Furthermore, it can be found whether the two classes have the same ability or are homogeneous. Table 3 describes the results of the homogeneity analysis.

Tabe 3. Poct hoc hasil perbandingan dari empat pertemuan

Levene's Test for Equality of Variances	
F	Sig.
.449	.505

From the analysis results obtained value F = 0.449 with a significant value of 0.505. The results of this analysis indicate that the two classes are homogeneous because the significant value is greater than the alpha value, which is 0.05. The two homogeneous classes are a requirement to proceed to independent t-test analysis to see whether there is a difference between the control class and the experimental class. Table 4 shows the results of the independent t-test analysis.

Table 4. Independent samples test

t-test for Equality of Means						
t	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**	**95% Confidence Interval of the Difference**	
					Lower	**Upper**
-7.048	62	.000	-1.040.625	147.649	-1.335.772	-745.478

The results of the comparative analysis of the control class and the experimental class obtained a significant value of 0.00. The significant value of 0.00 is smaller than the alpha of 0.05 so it can be concluded that there are significant differences in learning outcomes in the control class and the experimental class. These results indicate that digital learning media in the form of Adobe Animate CC which has been developed can improve student learning outcomes. Student learning outcomes increase after participating in learning activities carried out with a digital learning media approach. These results indicate that learning media that is maximally developed can improve student learning outcomes. Digital learning media can increase students' competency in learning mathematics (Maclinton & Andrian, 2022; Wardani & Setyadi, 2020). Learning media can provide a very valuable experience to students because students learn new things and have never obtained them during the learning process (Danielsson & Wiberg, 2006; de Freitas & Griffiths, 2008). Learning media is a learning facility that is very effective in shaping learning character, learning interest and learning motivation so that the use of learning media in class is the best thing and needs to be done continuously by teachers (Bektaş, Kılınç, & Gümüş, 2020; Thomas, van Garderen, Scheuermann, & Lee, 2015). Teachers need to master learning media development techniques that are relevant to technology according to students' needs. The teacher's ability to develop media needs to be a priority so that teachers can upgrade themselves in improving their teaching skills through effective learning methods, media or strategies.

Learning Motivation Overview

Learning motivation is described from meeting 1 to meeting 4. Learning motivation is described through an observation questionnaire during the learning process from meeting 1 to meeting 4. An overview of student motivation after participating in digital learning activities can be seen in Table 5 and Figure 1.

Table 5. Motivation comparation of first to fourth meeting

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18464.688	3	6154.896	393.951	.000
Within Groups	1937.312	124	15.623		
Total	20402.000	127			

Table 5 explains that, from the results of the one way ANOVA analysis, a sig value of 0.00 was obtained. These results indicate that there is a significant difference between the four meetings (significant because the value of Sig <Alpa). To see whether there are differences from the four meetings, the post hoc can show these differences in Table 6.

Table 6. Post hoc results of one way anova analysis

(I) Group_M	(J) Group_M	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
First	Second	-10.81250*	.98816	.000	-127.684	-88.566
First	Third	-22.59375*	.98816	.000	-245.496	-206.379
First	Fourth	-31.84375*	.98816	.000	-337.996	-298.879
Second	Third	-11.78125*	.98816	.000	-137.371	-98.254
Second	Fourth	-21.03125*	.98816	.000	-229.871	-190.754
Third	fourth	-9.25000*	.98816	.000	-112.059	-72.941
fourth	second	21.03125*	.98816	.000	190.754	229.871
fourth	third	9.25000*	.98816	.000	72.941	112.059

Based on Table 6, information was obtained that there were differences in students' learning motivation from the first meeting to the second, third and fourth meetings. There is a difference between the second meeting and the third and fourth meetings. There is a significant difference between the third meeting and the fourth meeting. These results indicate that digital learning media can increase student motivation. The developed learning media has followed the proper procedures so that an important target of the development activities is to improve learning outcomes or learning achievement and student motivation or interest in learning. Learning design with the correct procedures followed by a standardized and developed approach can increase student learning interest or motivation so that learning outcomes will also increase (Lee & Kuo, 2019; Rehman, Bhuttah, & You, 2020). Learning media developed with great effort can be the right way for a teacher to increase learning

motivation and student learning outcomes in class (O'Shea, Buckley, & Halbesleben, 2017; Rodríguez, Díaz, Gonzalez, & González-Miquel, 2019).

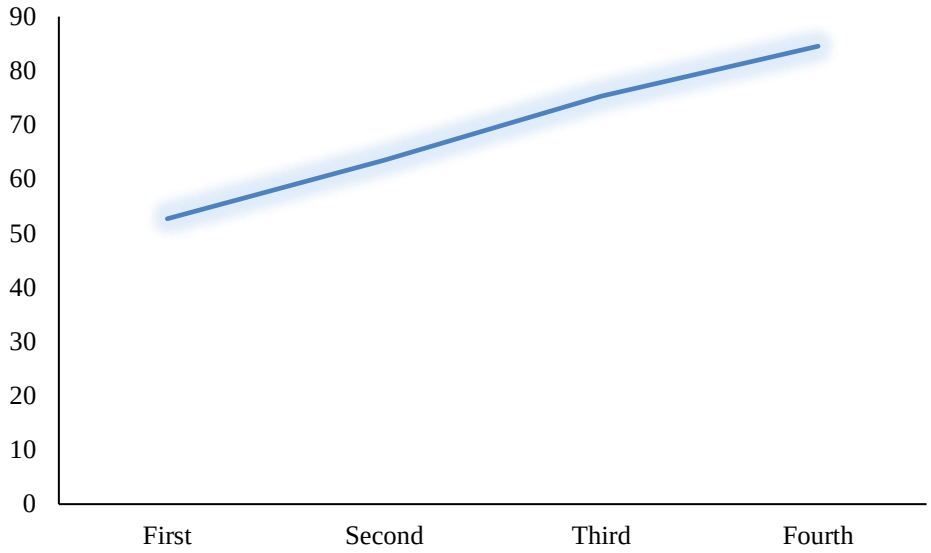

Figure 2. Students' learning motivation trendlines

From Figure 2 it can be seen the development or increase in the motivation of students who learn to use digital learning with Adobe Animate. From the results of the analysis it can be described that there is an increase in learning motivation or student learning interest in participating in mathematics learning with a computer-based application in the form of Adobe Animate CC. These results prove that Adobe Animate CC digital learning media is suitable for the age of junior high school children. Learning activities that are supported by learning media that are relevant to the age of students and the times can increase the interaction of teachers and students because interaction in class will take place when students are interested or have high motivation in learning mathematics (Park, Yang, & Sims, 2017). Learning media can be both traditional and modern which are very effective in increasing student learning motivation (Bye, Pushkar, & Conway, 2007; Parkerson, 2015). Empowering instructional media effectively can be the best way to improve student performance in understanding and mastering all the math materials provided by teachers in class (Alafgani & Purwandari, 2019; Hakim, Sa'ud, Komariah, & Sunaengsih, 2018; Mulyana et al., 2021). Learning media increases motivation, motivation increases school culture, and a good school culture can improve student learning outcomes (Heckhausen & Heckhausen, 2018; Thoonen, Sleegers, Oort, Peetsma, & Geijsel, 2014). Increasing motivation through appropriate learning media will increase student learning activities in class because the media can give pleasure to lessons and pleasure in learning will affect student learning outcomes.

▪ CONCLUSION

Based on the results of statistical analysis and it can be concluded that there are significant differences in student learning outcomes through the application of

interactive learning assisted by Adobe Animate CC. The experimental class has higher learning outcomes than the control class. Student motivation increased significantly from the first meeting to the fourth meeting. From the results of the Post Hoc analysis there are also significant differences in learning motivation in meetings 1 and 2, meetings 1 and 3, meetings 1 and 4. There are significant differences between meetings 2 and 3, and meetings 2 and 4. There are significant differences between meetings 3 and 4. Media interactive learning assisted by Adobe Animate CC can significantly improve student learning outcomes and motivation.

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