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The differences in geometry cognitive learning results using ICT *AdobeFlash CS6* program

M Zainil*, Y Helsa, S Ahmad, Y Ningsih, H Ningsih and W T Yanti

Universitas Negeri Padang, Padang, Indonesia

*Corresponding author: melva_zainil@yahoo.com

Abstract. This research is motivated by the lack of students' interest in learning mathematics that is considered to be difficult and tedious. Then, this problem results in the low cognitive learning outcomes of the students. The matter happens because the teacher is still considered to be the centre in the learning process, the lack of variations in instructional media, and the way the teachers teach in the class. This study aims to determine whether there are differences in the students' cognitive learning outcomes from the use of ICT instructional media using *adobe flash CS6* programs at SDN 01 and 09 Bandar Buat. This type of research is a quasi-experimental in the form of non-equivalent control group design. The sampling technique is purposive sampling, in which the first class is chosen as the control class and the second class is the experimental class. The instrument used in this study is an objective test with multiple choice types. The data analysis technique used is inferential statistical test with t-test. The results show that the values of the experimental class using the ICT media of the *Adobe Flash CS6* program based on STAD is 82.66 with a standard deviation 13.67, while the class that does not use ICT media of the *Adobe Flash CS6* program based on STAD is 74.84 with a standard deviation of 13.88. It can be concluded that the hypothesis testing using the t-test at the significance level $\alpha = 0.05$ obtained $t_{count} = 2.36$ and $t_{table} = 1.99$. Thus, the condition in which $t_{count} > t_{table}$ shows that the hypothesis H₀ is rejected.

1. Introduction

Mathematics is one of the important learning subjects in the process of education [1]. Elementary school students are required to learn mathematics [2]. Many students find that mathematics is very difficult to learn [3]. It is considered as a terrifying subject, so most of students do not like it [4]. The negative attitudes towards mathematics learning need to be addressed by teachers in order that students will no longer embrace such attitude [5]. Mathematics is a learning subject with an abstract object of learning. Meanwhile, elementary school students are bound to real or concrete objects that can be captured by the five senses [6]. Therefore, teachers need to have the ability to address and overcome these problems. One of these abilities is the right use of media. The use of media in learning can convey the core content of learning in the form of messages from teachers to students. Media is a component of the learning with their vital function for the learning process. In other words, media has a strategic position in learning [7]. Media is a component that contains learning messages to be delivered to students [8].

Science and technology should encourage teachers to strive for the innovative use of technology in the learning process [9]. In addition, the media is beneficial to make the learning and teaching process more interesting and interactive. It can also minimize teaching time to improve the quality of learning [10]. One of the learning media which employs technology is ICT media [11]. ICT (Information and



Communication Technology) is an information and communication technology system that can be used as a media in the teaching and learning process [12]. ICT is an innovative learning media [13]. This media has the advantages: 1) facilitating students' understanding of complex material 2) explaining abstract learning material to semi-concrete, 3) helping teachers present material easier and faster, 4) attracting and arousing students' attention, interest, motivation, activity and creativity, 5) providing a deep impression on students, 6) repeating previously learned material. 7) equating correct opinion and perception. 8) saving time, effort and cost [14] The Adobe Flash CS6 program is a program commonly used by animators in creating an animation design. This program is used because of its sophisticated and complete tools to create animated designs as desired. The Adobe Flash CS6 program is the most flexible program in creating animations, such as interactive animation, games, company profiles, movies, e-cards, and animations used on websites [15].

The advantages of ICT learning media, especially the Adobe Flash CS6 program, are the reason why the researcher selected ICT media in mathematics learning for elementary school students in high-grade level. The ICT media will be used by the researcher in mathematics learning with the topic solid figure for grade V. The developed IT-based learning media has potential effects such as students' increasing ability to answer questions and students' learning outcomes in good and very good categories. Finally, the use of the CS6 program helps students in learning mathematics. STAD cooperative learning is one of learning model types using a small group of 4-5 people who are heterogeneous. It is started from the delivery of learning objectives, delivery of material in general, group activities, quizzes / evaluations, and rewards[16]. STAD cooperative learning is a simple type of cooperative learning because the learning activities carried out are still closely related to conventional learning, namely the presence of information or subject matter.[17]

A preliminary study conducted on January 8-16, 2018 at SDN 01 and 09 Bandar Buat reveals that the interactive media had not been used on SD 01 and 09 Bandar Buat. The media that used was concrete media, audio media, visual media, and audio visual media. Expository method is still used as the main method with some questions and answers. 20% or around 5-6 students did not focus on learning. Some of them talked with their friends and others students played and ran outside the classroom.

2. Methods

The research method used is quantitative in the form of experiment. Experimental research is used to find out the influence of certain treatments under controlled conditions [18] The type of research used is the quasi-experimental design with nonequivalent control group design. This research will explore the differences in students' learning outcomes using ICT media learning adobe flash CS6 program from those without using ICT media adobe flash CS6 program. The population in this study is students' in SDN 01 Bandar Buat and SDN 09 Bandar Buat with the total population of 123 students. The method used in determining the sample is purposive sampling technique. This sampling technique is done by taking subjects not based on strata or random, but based on of certain goals [19]. Class Va is as control class and class Vb is as experimental class at SDN 01 Bandar Buat. Data collection method was by conducting an objective test. The test instrument used was validated by using Pearson Product Moment, difficulty level test, different power test questions. Data analysis used prerequisite tests, and hypothesis testing. The analytical prerequisite test used is normality test and homogeneity test. To test for normality, the Lilifors method was used and to test homogeneity the Fisher method was used. Meanwhile to test the hypothesis, the t-test was used.

The research was conducted at SDN 01 and 09 Bandar Buat from May 04 2018 until May 12 2018. The population in this study are all fifth grade students of SDN 01 and 09 Bandar Buat with the total number of 123 people. The research sample class consists of 32 students of VB SDN 01 Bandar Buat as the experimental class and 32 VA students as the control class. In conducting the learning process, the experimental group was given the treatment of applying learning using ICT media to the Adobe Flash CS6 program based on STAD. Meanwhile, the control class was given STAD without ICT media Adobe Flash CS6 program.

3. Results and Discussion

The experiment class with the number of 32 students gets the highest score of 85 and the lowest score of 15. From the score of the experimental class, the average score obtained is 53.75 with standard deviation of 18.31 and variance of 335.48. The control Class with the number of 32 students gets the highest score of 95 and the lowest score of 15. From the score of the control class, the average score obtained is 52.81 with standard deviation of 18.44 and variance of 340.22 as shown in Table 1.

Table 1. The results of the pre-test in experimental class and control class at SDN 01 Bandar Buat Padang

Variable	Pre-test	
	Experimental Class	Control Class
N	32	32
Highest Score	85	95
Lowest Score	15	15
Mean	53,75	52,81
SD	18.31	18.44
SD ²	335.48	340.22

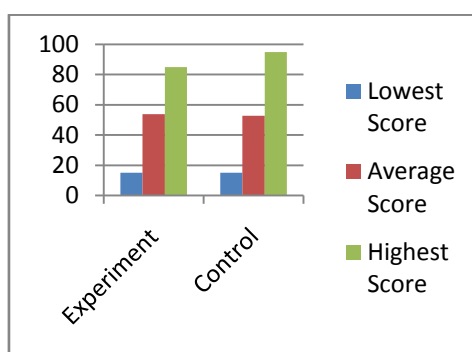


Figure 1. The Comparison of pre-test result in experimental class and control class

The post-test score of cognitive learning outcomes on the topic of the solid figure properties in the experimental class and control class that can be seen in Figure 1.

The experiment class with the number of 32 students gets the highest score of 100 and the lowest score of 60. From the score of the experimental class, the average score obtained is 82.66 with standard deviation of 13.67 and variance 187.07. The control class with the number of 32 students gets the highest score of 100 and the lowest score of 40. From the score of the control class, the average score obtained is 74.84 with standard deviation of 13.88 and variance of 192.71, can be seen in Table 2 and Figure 2.

Table 2. The post-test result of cognitive learning outcomes on the topic of identifying the solid figure properties in the experimental class and control class at SDN 01 Bandar Buat Padang

Variable	Post-test	
	Experimental class	Control Class
N	32	32
Highest Score	100	100
Lowest Score	60	40
Mean	82.66	74.84
SD	13.67	13.88
SD ²	187.07	192.71

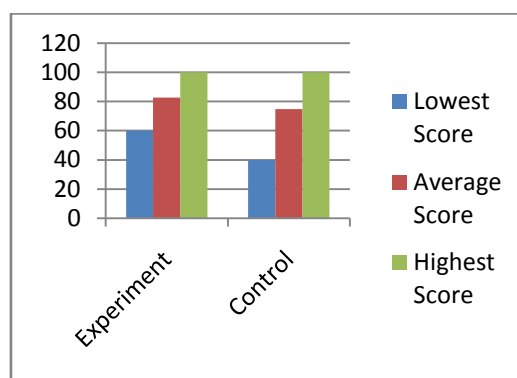


Figure 2. The comparison of the post-test results in experimental class and control class

The purpose of data analysis in this study is to determine the differences in cognitive learning outcomes using ICT media with Adobe FlashCS6 program based on STAD. Data analysis was carried out by Normality Test using the Liliefors test for the pre-test score of the control class (VA) and the experiment (VB). If $L_{0} < L_{table}$ value is obtained, the sample is declared to be normally distributed as shown in Table 3.

Table 3. The Result of Normality Test for pretest score

Class	L_0	L_{table}	Description
Experiment	0.090	0.156	Normal
Control	0.129	0.156	Normal

Data analysis was then carried out by homogeneity test using the Barlett test for the pre-test in control class (VA) pre-test and experiment (VB). if the $X_{Obtained} < X_{table}$ is obtained, the sample is declared to have a homogeneous variance, shown in Table 4.

Table 4. The Result of Normality Test for pretestscore

Class	$X_{obtained}$	X_{tabel}	Description
Experiment and Control	7.46	7.81	Homogen

Data analysis was carried out by Normality Test using the Liliefors test for the post-test score of the control class (VA) and the experiment (VB). If $L_0 < L_{table}$ value is obtained, the sample is declared to be normally distributed as shown in Table 5.

Table 5. The Result of Normality Test for post-testscore

Class	L_0	L_{tabel}	Description
Experiment	0.137	0.156	Normal
Control	0.136	0.156	Normal

Data analysis was then carried out by homogeneity test using the F test for If the $F_{Obtained} < X_{table}$ is obtained; the sample is declared to have a homogeneous variance that can be seen in Table 6.

Table 6. The Result of Homogeneity Test for post-testscore

Class	S^2	F_{table}	$F_{obatined}$	Description
Experiment	187.07	1.82	0.97	Homogen
Control	192.71	1.82	0.97	Homogen

The next test was hypothesis testing with one-party t-test. Based on the t-test, $t_{obtained}$ is 2.36 with $t_{table} = 1.99$. Because $t_{obtained} > t_{table}$, H_0 is rejected, and H_1 is accepted. Hence, there are significant differences of the use of ICT media in the Adobe Flash CS6 program on cognitive learning outcomes on the topic of identifying the solid figures properties for Graed V at SDN 01 Bandar Padang.

The use of media in learning is needed to convey the core of learning in the form of messages from teachers to students. The use of ICT-based media is an effort to improve learning outcomes creatively, innovatively and efficiently. One of them is by using Adobe Flash CS6.

Based on the results of this research conducted, it is proven that ICT media is effective in learning mathematics. There are differences in students' learning outcomes in experimental class taught by using ICT Media with Adobe Flash CS6 Program from students' learning outcomes of students taught without using ICT Media with Adobe Flash CS6 Program. The following discussion will describe the learning process in the experimental class by using ICT Media with Adobe Flash CS6 Program and an overview of learning in the control class taught without using ICT Media with Adobe Flash CS6 Program.

The learning process in the experimental class used STAD and ICT media with Adobe Flash CS6 program. At first, the students were classified into 7 heterogeneous groups. Then, the researcher sent a group representative who could operate a laptop in his group. After understanding what they would do with the laptop, students returned to their respective groups. The representative started operating a laptop that was provided in each group. Each group was free to choose the material they would learn first, but they must master all the material. After all groups finished understanding the material in the media, the researcher gave post-test to all students. During the learning process, all the students of the experimental class were very enthusiastic because the use of ICT media was new to them students.

The learning process in the control class used a cooperative model type STAD without using ICT media with Adobe Flash CS6 Program. At first, students were classified into 7 heterogeneous groups.

Then, the students of each group were distributed with the same material that must be mastered entirely. Students discussed with the group. After that, the writer gave post-test. The students were not as enthusiastic as those in the experimental class. Some students were still busy doing things and looking out of class during discussions. The lack of curiosity of students in the control class was higher compared to the experimental class.

The testing of the hypothesis in this study is to see whether there are differences in students' learning outcomes using ICT media Adobe Flash CS6 program that is tested by using inferential statistics of t test. Based on the results of data analysis, there are differences in students' learning outcomes in taught by using ICT Media with Adobe Flash CS6 Program from students' learning outcomes taught without using ICT Media with Adobe Flash CS6 Program. These differences are seen in the test given to the experimental class and control class. Using the ICT media in the experimental class increases students' learning. Learning outcomes are abilities that students have after their learning experience [20].

The learning outcomes in both classes can be seen in the test done by students individually. Based on the results of learning outcomes, the higher score of the experimental class is 100 and the lowest score is 60 with the average score of 82.66. Meanwhile, the highest score for the control class is 100 and the minimum score is 40 with the average score of 74.84. Thus, it can be concluded there are differences in students' learning outcomes in taught by using ICT Media with Adobe Flash CS6 Program from students' learning outcomes taught without using ICT Media with Adobe Flash CS6 Program. The high score obtained in the experimental class is due to the learning process with the ICT media Adobe Flash CS6 program that makes students very enthusiastic and curious because of this new media. Learning outcomes are behaviours that arise from learning, for example from not knowing to knowing, the emergence of new questions, changes in the habits of skill, appreciation, development of social, emotional and physical growth [21]. Thus, the ICT media Adobe Flash CS6 program can affect students, learning outcomes.

4. Conclusion

Based on the results of the research, the average post-test score for the experimental that applied ICT media Adobe Flash CS6 program with STAD is 82.66 and the average post-test score for the control class test that did not apply ICT media Adobe Flash CS6 program is 74.84. Based on the results of hypothesis testing using the t-test, it is obtained $t_{table} = 1.99$ and $t_{obtained} = 2.36$. Thus, it can be concluded that at a significant level = 0.05, there are differences in cognitive learning outcomes of grade V geometry learning with ICT media Adobe Flash CS6 program with STAD at SDN 01 Bandar Buat.

References

- [1] Kepalait A and Legkauskas V 2014 *Procedia Soc. Behav. Sci.* **116** 2936
- [2] Sumirattana A, Makaanong A and Thipkong S 2017 *Kasetsart J. Soc. Sci.* **38** 307
- [3] Morina C 2014 *Procedia Soc. Behav. Sci.* **159** 309
- [4] Turan B 2014 *Procedia Soc. Behav. Sci.* **141** 1386
- [5] Smith C 2008 *Res. Math. Educ.* **12** 99
- [6] Tawil N M, Shaari I, Zaharim A, Othman H and Ismail N A 2013 *Procedia Soc. Behav. Sci.* **102** 122
- [7] Van Den Ham A and Heinze A 2018 *Stud. Educ. Eval.* **59** 133
- [8] Phosuwan A, Sopeerak S and Voraroon S 2013 *Procedia Soc. Behav. Sci.* **103** 410
- [9] Acikalın M, Studies S, Education G and Duru E 2005 *Turkish Online J. Educ. Technol.* **4** 18
- [10] Porter A L and Worthy A L 2017 *Int. J. Emerg. Math. Education.* **1** 11
- [11] Zainil M, Prahmana R C I, Helsa Y and Hendri S *J. Phys.: Conf. Ser.* **943** 012046
- [12] Masniladevi, Prahmana R C I, Helsa Y and Dalais M 2017 *J. Phys.: Conf. Ser.* **943** 012059
- [13] Ariani Y, Helsa Y, Ahmad S and Prahmana R C I 2017 *J. Phys.: Conf. Ser.* **943** 012056
- [14] Arkadjevna Z T 2014 *Conf.: 2014 Int. Conf. Adv. ICT* **2** 1

- [15] Ampera D 2017 *Conf.: Int. Conf. Technol. Vocat. Teach.* **102** 314
- [16] Hartono Y and Helsa Y P 2011 *Proceeding Int. Semin. Fourth Natl. Conf. Math. Educ.* Yogyakarta, Indonesia
- [17] Slavin and Robert E 2009 *Cooperative Learning*. (Bandung: Nusa Media).
- [18] Rosita D and Rustandi A 2018 *Conf.: 2017 Int. Conf. Educ. Technol.* **144** 107
- [19] Kariman D and Wulan R 2014 *Conf.: ICAET* **15** 113
- [20] Fatimah J M 2017 *Conf.: Unhas Int. Conf. Soc. Political Sci.* **143** 95
- [21] Hamalik and Oemar 2012 *Proses Belajar Mengajar* (Jakarta: Bumi Aksara)