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The effect of edutainment toward students' interest in learning mathematics

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Abstract. The aim of this research was to examine the effect of edutainment toward student's interest in learning mathematics. Edutainment in this paper was an educational software on the smartphone. This research was conducted in Secondary High School Yogyakarta Indonesia. The respondents were students in two classes, i.e. the control class with 29 respondents and the experiment class with 29 respondents. Both of classes had given pre-test. The respondents had same level of knowledge and ability. The edutainment software was used to support the teaching and learning process in experiment class. The control class was taught using conventional method without using edutainment software. This research was a quasi-experimental research. The effectiveness of the class using edutainment software and the class without using edutainment software was determined by one sample t-test. The students' interest differences of the class using edutainment software and the class without edutainment software are investigated using anova. The results showed that, (1) learning mathematics with edutainment was effective in regards to students' interest, (2) there was significant difference in term of students' interest between those who use edutainment software and their counterparts, and (3) learning mathematics using edutainment software was better than learning mathematics without using edutainment software.

1. Introduction

In learning mathematics, students relate to learning activities. Meaningful and fun activities can help students learning mathematics better. One way to create fun learning activities is providing entertainment while learning. With the entertainment in learning, students will enjoy in the learning activities so that the expected goal of learning can be achieved.

Learning combined with entertainment is called edutainment [1]. In edutainment, students can learn while playing. Edutainment can be an innovative learning media in accordance with technological advances at this time. The rapid development of technology in the last two decades can be a great opportunity to integrate them into learning processes. Previous research studies found that, edutainment learning media can increase students' interest and motivation [2, 3].

Edutainment learning media that can be used is edutainment learning media on smartphones. The use of smartphones as edutainment learning media is considered relevant to the development of Information and Communications Technology (ICT) in the present. Furthermore, smartphone users at secondary high school are also quite a lot [4]. Therefore, learning by using edutainment learning media



on smartphones is expected to improve the quality of learning mathematics students, especially on student interest.

Edutainment means combination education and entertainment. Colace [1] states that edutainment is a type of entertaining which is designed with the aim of educate by including entertaining variety such as multimedia software, internet sites, music, films, video and computer games and TV programs in order to exhilarate in addition to educate. Furthermore, edutainment is named as a hybrid mix of education and entertainment that relies heavily on visual material, on narrative or game-like formats, and on more informal, less didactic styles of address [5]. By using edutainment, learners learn the material in enjoyable environment. The purpose of edutainment is to attract and hold the attention of the learners by engaging their emotions through a computer monitor full of vividly colored animations [6].

The edutainment in this study is an application for smartphone called "Circle". "Circle" has been valid and practical based on the results of expert judgments assessment, assessment of teacher, and student responses. "Circle" contains selected menus such as competencies to be achieved, materials, games, rules, and info about media. Materials in "Circle" is made communicative and interesting with animation and full color. Games in "Circle" is made like arcade games with inserted some exercises in game.

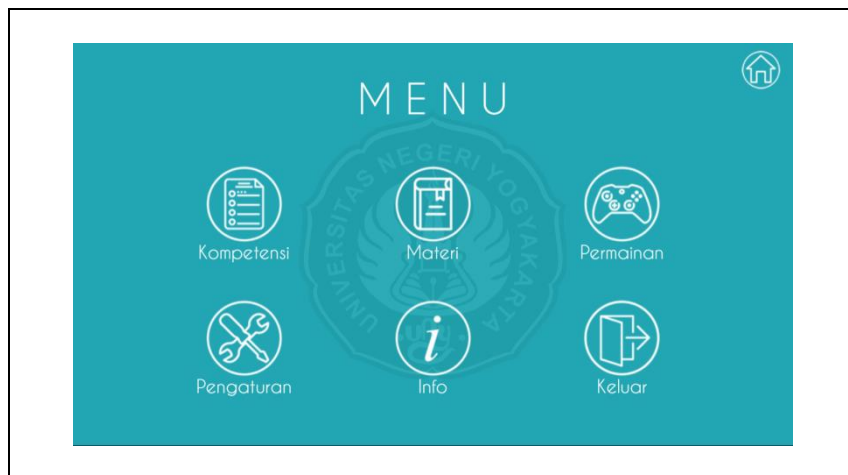


Figure 1. Visualization of menu in "Circle".



Figure 2. Visualization of materials in "Circle".



Figure 3. Visualization of Games in “Circle”.

Interest is one of factor that can affect person to do something activity. As Dewey [7] has expressed interest in being “engaged, engrossed, or entirely taken up with some activity”. Other opinions also defines interest as a motivational variable that refers to the involvement of individual within a particular class of objects and activities [8]. Furthermore, Ainley, Hidi, and Berndorff [9] divides the interest into three types, namely individual interest, situational interest, interest in the topic. Individual interest is regarded as individual inclinations to deal with specific stimuli, events, and objects. Situational interest is caused by certain environmental aspects. While the interest of the topic is caused by certain topic or subject.

In this research, interest measured is situational interest and topic interest. Situational interest consists of two aspects, (a) on the learning of mathematics and (b) on the media of mathematics learning. Topic interest about mathematics materials.

2. Experimental Method

This research was quasi-experimental research. The research design used pre-test and post-test non-equivalent groups. This research was conducted at a secondary high school located Sleman Regency, Yogyakarta. The respondents in this research had same level of knowledge and ability. The respondents consisted of two classes, the control class contains 29 students and the experiment class consists of 29 students.

The procedure in this research started from given pre-test in both classes (experiment and control) to measure students' interest before treatment. Furthermore, the experimental class was given treatment by learning with "Circle" meanwhile the control class used textbook instead of “Circle”.

The instrument in this study was a questionnaire to measure students' interest. The questionnaire consisted of 20 statements consisting of positive and negative statements. Instrument validity used content validity. This instrument had been declared valid by two expert judgments.

Data analysis in this research consisted of descriptive analysis and inferential analysis. Descriptive analysis of mean value, standard deviation, and variance of the pre-test and post-test questionnaires of students. Furthermore, the score converted from quantitative into qualitative data based on the following criteria.

Table1. Qualitative Criteria of Students' Interest.

Interval	Interval	Category
$\bar{X} > \bar{X}_i + 1,8Sb_i$	$\bar{X} > 84$	Very High
$\bar{X}_i + 0,6Sb_i < \bar{X} \leq \bar{X}_i + 1,8Sb_i$	$68 < \bar{X} \leq 84$	High
$\bar{X}_i - 0,6Sb_i < \bar{X} \leq \bar{X}_i + 0,6Sb_i$	$52 < \bar{X} \leq 68$	Medium
$\bar{X}_i - 1,8Sb_i < \bar{X} \leq \bar{X}_i - 0,6Sb_i$	$36 < \bar{X} \leq 52$	Low
$\bar{X} \leq \bar{X}_i - 1,8Sb_i$	$20 < \bar{X} \leq 36$	Very Low

3. Result and Discussion

The results of this research are divided into two parts, namely the description of research results and hypothesis testing. Description of student interest data for both experimental and control groups can be seen in Table 2.

Table 2. Data Description of Students' Interest.

Description	Experimental Class		Control Class	
	Pre-test	Post-test	Pre-test	Post-test
Mean	72.48	80.52	69.65	69.79
Standart Deviation	9.67	10.07	9.2	10.42
Variance	93.62	101.4	84.6	108.6
Maximum Score	96	96	95	94
Minimum Score	55	56	55	50

Table 2 shows that there is increase of the average score in the experimental class and control class. The average score in both classes are increase, 8.04 for the experimental class and 0.14 for the control class. On the pre-test, standard deviation of the experimental class is greater than standard deviation control class by 0.47. However, on the post-test, standard deviation of control class is greater than standard deviation of experimental class by 0.35.

The pre-test and post-test results are then converted into very high, high, medium, low, and very low categories. The result of grouping can be seen in Table 3.

Table 3. Frequency Distribution of Pre-test and Post-test Score of Students' Interest in the Experimental Class and Control Class.

Interval	Category	Experimental Class				Control Class			
		Pre-test		Post-test		Pre-test		Post-test	
$X > 84$	Very High	4	13.79%	11	37.93%	2	6.90%	2	6.90%
$68 < X \leq 84$	High	14	48.28%	14	48.28%	13	44.83%	14	48.28%
$52 < X \leq 68$	Medium	11	37.93%	4	13.79%	14	48.28%	12	41.38%
$36 < X \leq 52$	Low	0	0.00%	0	0.00%	0	0.00%	1	3.45%
$20 \leq X \leq 36$	Very Low	0	0.00%	0	0.00%	0	0.00%	0	0.00%

Based on pre-test score in Table 3, there is no students' who have low and very low on pre-tests in both the experimental class and the control class. However, there is one student in the control class who is in the low category in the post-test. In the experimental class, there is an increase on students' interest in very high category. However, the number of students who have very high interest in control class are stay the same.

Before doing the inferential analysis, normality and homogeneity assumptions are tested. The assumption test results can be seen in following Table 4 and Table 5.

Table 4. Normality Test

Class	Before Treatment	After Treatment
	(sig.)	(sig.)
Experimental	0.200	0.124
Control	0.200	0.200

Based on Table 4, the signification value before and after treatment in both classes is greater than 0.05, then the data are normally distributed.

Table 5. Homogeneity Test.

	Before Treatment	After Treatment
Sig.	0.740	0.951

Based on Table 5, the value of significance before and after treatment is greater than 0.05. It shows that both classes are homogen.

In the first inferential analysis, the data on experiment class using edutainment software were tested using one sample t-test. Based on the result obtained $t\text{-value} = 3.08$ while $t\text{-table}(0.05, 29) = 1.69$. Because t is larger than $t\text{-table}$ so H_1 is accepted. So we can conclude that the class using edutainment software on learning mathematics are effective to increase students' interest in learning mathematics.

Then we continue to compare two classes in the pre-test and post-test to show a significant difference between the two classes before and after treatment is applied.

Table 6. ANOVA Test.

	Before Treatment	After Treatment
Sig.	0.237	0.000

On the before treatment, based on Table 6 obtained significance value of 0.237. Because of $0.237 > 0.05$, it shows that there is no significant difference in the two classes. Based on these results, it can be conclude that students' interest in both classes is relative same before treatment is given. Furthermore, the post-test value obtained significance of $0.00 < 0.05$. Thus it is concluded that there is a significant difference between the experimental class and the control class after the treatment is given..

The last, doing analysis to find which learning is better base on students' interest after treatment is given. The test results in this hypothesis can be seen in Table 7 below.

Table 7. Independent Samples t-Test.

	t-value	Significance
Value	4.42	0.000

Based on Table 7, shows that $t\text{-value} = 4.42$ is larger than $t\text{-table}(t_{0.05;57}) = 1.67$ and the significance value $0.00 < 0.05$, it is concluded that learning using edutainment software is more excellence viewed from the students' interest when compared with the control class.

Edutainment makes fun learning and sparking interest in learning. The combination of education, technology, and entertainment make learning more attractive, entertaining, and interesting [10]. In accordance with the result of research by Zain and Zin [3], more than 85% of respondents expressed their positive interest about the edutainment software. Furthermore, 93.3% of respondents said that the learning and teaching process become more interesting when they learned using this interesting edutainment software.

Makarius [11] states that edutainment is a tool to engage students in management content in an interesting and innovative way. Teaching using edutainment software can be made more easily by attracting learners' attention and making subject and information which will be taught with edutainment approach more enjoyable [12]. Edutainment provides an opportunity to acquire knowledge in an interesting way, allowing trained students with different abilities to obtain information at the same level [13].

The class that uses edutainment learning media is more excellent than the class does not use edutainment learning. It causes in the experimental class, students feel happy in learning. With a sense of pleasure in students, it will lead to their motivation to learn. Interesting material presentation and

challenging games also have a great influence on students' interest. Students are usually only learning by using a textbook or explanation by teacher directly on the whiteboard. It makes students that feels bored with learning method because there is no variation in learning. In short, the edutainment learning media can increase students' learning interest in mathematics.

4. Conclusion

Based on the result of data analysis in this research, we can conclude that learning mathematics with edutainment is effective in terms of students' interest. In addition, there is significant difference of students' interest for those learn mathematics with and without edutainment media. However, learning mathematics using edutainment software is more excellence than without edutainment software. It is suggested to teachers to use edutainment media in mathematics teaching and learning. Teachers can use the applications that have been available in accordance with the material to be taught. In the era of globalization, teachers are required to prepare their students in the face of ever-changing progress, including the progress of ICT. Thus, teachers should be able to develop their own edutainment media on their learning.

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