The Effectiveness of A PBL Based Android Learning Model of Learning Outcome Z Generation

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Abstract. The Z generation is the generation born after the '90s, the z generation is very close to technology. With the fourth industrial revolution, the education world became the forefront of the digital age and had to adapt to technological development. To answer the challenge, it would need to be an innovation in education in the implementation of an innovative learning system in order to increase Z generation's ability especially in the learning outcome. It was designed to compare the effectiveness of a PBL-based android's learning model of learning outcome the z generation. This quasi experiment research used a desain Non-Equivalen Group Desain. The subject of this research is Z generation of the students of Economics semester 2. From the subjects selected class A students as experimental class and Student class B as a control class. The data were analyzed using a paired sample t-test at a significance level of 0.05. The research finding proved that PBL-based android's learning model is more effective than PBL learning model, the research shows the average gain score of students with the PBL-based android's learning model is higher than that of student through the PBL learning model

Keywords: android, learning model, Z generation

1 Introduction

Technology and information have been rapidly developing in the past 10 years. This development has caused the change of lifestyle, mindset, learning style, and other life aspects. The Industrial Revolution 4.0 is today‘s era which is marked by massive use of Technology Information in many areas. The development of internet and digital technology continues to make things easier and without dealing with data and computerization.

The greatest impact is felt by the generation born and/or growing up during this technological explosion. This generation is often called “Generation Z”. Generation Z are the people who were born around 1995 through 2010. Generation Z is also called as Generation net because they live in digital era. Defined generasi Z or digital generation as young generation who grow and develop with a great dependence on the digital technology. They are very close and exposed to growing and developing internet and digital media [1].

The children who were born around 1995-2010 are taking education at the high school level or at university. As Generation Z, they easily know and undestand how to use the technology. As students they quickly control digital information media both for their school needs or entertainment.

Facing this situation, the educational world must stand at the forefront and must be able to adapt to technological development. To answer the challenge, innovation in education should be made, for example the practice of innovative learning system that can improve student’s

ICE 2019, September 28-30, Purwokerto, Indonesia

DOI 10.4108/eai.28-9-2019.2290990

ability and learning outcomes. A way to do so is through the application of digital technology in learning.

Realizing the importance of improving learning outcomes, many teachers and researchers developed learning models that make use of digital technology with the hope of improving Generation Z's learning outcomes. One of the models is PBL (Problem Based Learning), a model that exposes students to real-life problems so they can manage, think critically, analyze and solve the problems. According to some studies, PBL model can help teachers improving their student's literacy ability. The learning would be effective, efficient, and giving maximum outcomes [2].

The implementation of technology based PBL model could improve student's learning outcomes and literacay abillity. This is in accordance to studies proving that PBL (Problem Based Learning) model with the help of information and comunication technology can develop student's critical thinking [3].

The digital technology innovation used here is *mobile learning* with *android* system. The reason is because students today must be able to use free and available information technology so that they can use it as the source to find solution for their daily problems. It is also hoped to improve student's analytical skills in the middle of this progressive digital technology. The students are also expected to use it wisely. The studies showed that the implementation of android based learning media improved high school students' motivation [4].

The explanation above tells that learning needs a model that can improve the outcomes in the middle of this advanced technology era. In addition, as a facilitator lectures should be able to do innovation in their teaching.

Economy Education study program is asked to continuesly develop high quality learning in producing competitive graduates. Lectures should change conventional learning to mobile based learning in order to improve learning outcomes. The problem studied in this research was: Is android based PBL model more effective than conventional learning model?

2 Method

2.1 Type of reseach

This research was a quantitative research with *Quasi Exsperimental* approach. called as a *Quasi Exsperimental study* because the treated subjects could not be fully controlled. The study used *Non-Equivalen Group Design*.

2.2 Place and time of the research

This research took a place in Economy Education Program and needed 7 hours to teach the material. Every meeting lasted for 100 menit. So it needed 4 meetings to complete all the materials.

2.3 Research subject

The subject of this research was the second semester students of Economy Education who took Economic Sociology class. Decided in random, Students of Class A were chosen as

experimental class and Students of Class B were controlled group. The total participants in each class were 35 students.

2.4 Data collection

Technique and instrument of data collection were (1) Tests to collect student's score before and after the experiment (2) Observation to understand the learning condition before the research. The test was used to collect data of student's scores before and after attending classes.

2.5 Data analysis

The data described in this research was pretest and pos test scores which was processed and analyzed on SPSS for windows. T-test was used for measuring the normality value of each learning model. To determine the rejection and accepteance of null hypothesis, The researcher interpreted the result of variant analysis from SPSS with a criteria of error opportunity value <0,05 for the null hypothesis (Ho) to be rejected.

3 Results

This research contained some data including data of student's learning outcomes from pretest, postest and N-gain. The data was described in detail in the following table and chart.

Table 1. Pretest score of experimental and controlled classes

Score	Experimental	Control
61-63	0	0
58-60	6	6
55-57	14	13
52-54	7	4
49-51	3	6

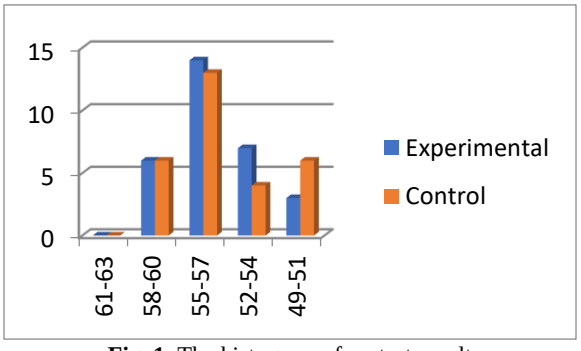

Fig. 1. The histogram of pretest result

Table 2. Post test scores of experimental and controlled classes

Score	Experimental	Control
78-79	7	5
76-77	6	8
74-75	8	11
72-73	0	3
70-71	2	1

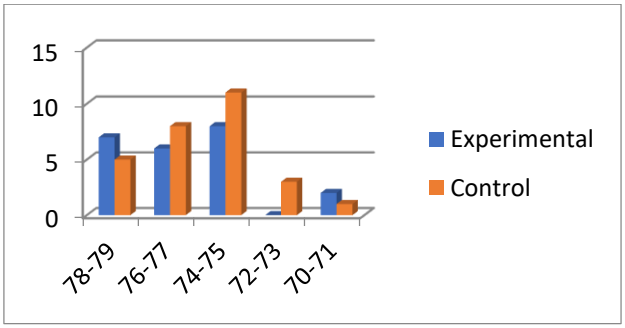

Fig. 2. The histogram of post test result

Table 3. N-gain scores of experimental and controlled classes

Score	Experimental	Control
26-29	3	4
22-25	13	10
18-21	9	8
14-17	4	7
10-13	0	1

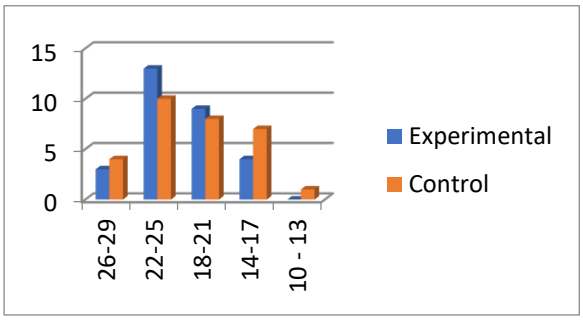

Fig. 3. The histogram of N-gain result

Table 3 shows the sig. value > 0,05, which means the average data of experimental and controlled classes was normally distributed. The homogeneity test results are presented in the following **Table 4**.

Table 4. The result of normality testing on experimental and controlled group

Variabel	Sig.	Conclusion
Pretest kontrol	0,095	Normality
Postest kontrol	0,508	Normality
N-gain Kontrol	0,768	Normality
Pretest eksperimen	0,102	Normality
Postest eksperimen	0,212	Normality
N-gain Eksperimen	0,937	Normality

The **Table 4** shows the sig. value > 0,05 which means H_0, the homogeneous variant research sample data, is accepted. In other words, this reasearch had homoneneous group variant or the same variant groups.

To test the effectiveness of Economic Sociology learning factors and android based PBL learning model on student's learning outcomes. Decision making and conclusion from hypothesis testing were done with the significance level of 5%. The criteria used in drawing conclusion were if the error opportunity < 0,05, the null hypothesis (Ho) is rejected and if the error opportunity > 0,05, the null hypothesis (Ho) is accepted.

The hypotheses are H_o: Android based PBL learning model is more effective that conventional learning model in improving Generation Z's learning outcomes, H_1: Android based PBL learning model is not more effective than conventional learning model in improving Generation Z's learning outcomes. Furthermore, the analysis on hypothesis T-testing is presented in the **Table 5** below.

Table 5. The homogeneity test of experimental and controlled classes

Variabel	Sig.	Conclusion
Pretest	0,16	Homogeneity
Postest	0,175	Homogeneity
N-gain	0,21	Homogeneity

From **Table 5**, it can be seen that the analysis on the effectiveness of Android based PBL learning model and Conventional learning model in improving student's learning outcomes resulted in the error opportunity value higher than the set significance level value, which is 0,05. According to the result, It can be concluded that the alternative hypothesis (H_1) was rejected. It indicated that Android based PBL learning model was more effective than conventional one in improving the learning outcomes of Generation Z.

4 Discussion

This part is discussing about the effectiveness of implementing android based PBL model and conventional model in improving generation Z's learning outcomes. Different from conventional learning, Problem based learning improves student's learning outcomes. In addition, it also boosts student's confidence [5]. According to data analysis and the first hypothesis testing, The android based PBL group showed increased score average compared to conventional group. This means android based PBL is more effective than conventional model in increasing student's learning outcomes.

This is in line with the studies which found that PBL model assisted by communication and information technology can improve student's scientific literacy ability of knowledge domain [6] and improve their understanding about the concept and problem solving ability [7].

In addition to that, PBL model was more effective because it employed familiar devices that had an effect on student's learning outcomes [8], and got positive feedback from students [9]

5 Conclusion

Based on the result of hypothesis testing and discussion above, a conclusion is drawn. Android based PBL learning model is more effective than conventional learning model in terms of improving Generation Z's learning outcomes. From the research conclusion and implication, it is suggested: (1) to improve Generation Z's learning interest and result in learning process by practicing Android based learning models, (2) to give training to lectures about developing Android based learning model in order to foster their creativity in using the model in their own classes, and (3) facility like internet access must be available in order to support the learning model.

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