Jurnal Penelitian dan Pembelajaran IPA JPPI
Vol. 4, No. 2, 2018, p. 158-166 p-ISSN 2477-1422 e-ISSN 2477-2038

The Influence of Learning by Smartphone to the Conceptual Science Knowledge and the Independence of Students' Learning at Junior High School

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(Received 30 October 2018; Revised 30 November 2018; Accepted 30 November 2018)

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DOI: 10.30870/jppi.v4i2.3925

Abstract

This study aims to determine the effect of using smart phone learning on science knowledge conceptual and independence of students' learning in junior high school. The design of quadratic control groups is used on this research with all seventh grade students at Serang-Banten City Junior High School as the population. The random technique samples are VII A grade as an experimental class and VII B grade as the control class, so it can be measured the conceptual science knowledge and scaling the independence of students' learning by questionnaire. Independent sample T Test survey result shows using the smart phone has an impact to science knowledge with a significance value of 0.002 and an independence of student's learning with a significance value of 0.003.

Keywords: Smartphone for Learning, Conceptual Science Knowledge, Learning Independence, Junior High School

INTRODUCTION

Science or Science learning is very important to constantly be developed and analyzed. in terms of material and learning, science continues to experience change to become more extensive and complex. Science as a complex science is a science whose truth is derived from scientific activities both in the laboratory and in the surrounding environment. The activity was carried out to get a systematic theory that was used for general-natural phenomena. This is a big challenge for teachers to explore themselves with the aim achieve satisfying learning goals for students. One of the way is by increasing creativity in transferring knowledge to students. Based on the results of the Octavia study (2014) teachers need to improve their creativity in learning. This is because the creativity of the teacher is useful in stimulating students to think more scientifically in observing community symptoms or natural phenomena that are the object of study in learning.

In science learning, direct experience is needed to understand existing knowledge. Such knowledge includes facts, concepts, or principles. As according to Anderson and Karthwohl (2010) the category of knowledge includes facts, concepts, procedures, and metacognitive knowledge. Conceptual knowledge includes knowledge of categories, classification, and the relationship between two or more categories or classification of knowledge that is more complex and organized. When students have a good mastery of the concept of science learning, it can be a vehicle for students themselves to develop themselves and their surroundings in applying it in everyday life.

Self-development is important as a form of conscious effort for students to be better. One of the students' abilities that need to be developed is learning independence. This is important for students going forward, as a provision in developing themselves. According to Syah (2013), the process of self-development whose purpose is the independence of students' learning is very closely related to the teaching and learning process. The factors that influence learning consist of external factors, namely the environmental conditions around students; internal factors, namely the physical and spiritual conditions of students who are totally inseparable from the process of students' learning independence; and learning approaches as students' learning efforts that include strategies and methods that students do in learning subject matter. Susilowati (2017) said that there is a significant relationship between learning independence and students' learning

outcomes. This shows the existence of internal factors of students in improving learning outcomes one component is the conceptual mastery of science.

At the level of junior high school (SMP) in Indonesia, science subjects are grouped into three, namely physics, chemistry and biology. In the implementation of science subjects with three fields of science combined into integrated science. One of the material in integrated science subjects is calor material. The concepts that exist in calor material are closely related to everyday life. But in reality students have difficulty understanding the concept. Based on the results of observations at junior high school Serang-Banten, contextual learning by combining technology is very rare.

Science learning that is supported by technological advances such as the use of smartphones in the form of android is very good to do. Science learning becomes more alive and follows technological developments with the use of smartphones (Gonzalez et al; 2015). Smartphones are cellular telephone devices developed by implementing a computer-based operating system. The operating system used on smartphones today is generally the Android operating system. The development of smartphones until now is not only limited as a communication tool, but nowadays smartphones are widely used as learning media. Given the high use of smartphones by students, teachers should facilitate students to use smartphones as learning support media.

The hope with the use of smartphones in the form of android can increase students' learning motivation. As the results of Lubis and Ikhsan (2015) research which states that the development of android-based chemistry learning media to improve students' motivation and learning outcomes. Based on the above problems, no research on the effect of smartphone use on science conceptual knowledge and students' learning independence in junior high school, so the researchers are interested in conducting research with the aim to determine the effect of using smart phone learning on science knowledge conceptual and independence of student's learning in junior high school

METHOD

This research method is a quasi-experimental method. The research design is non-equivalent control group design. This research was conducted in one of the Serang City Junior high School. The research was conducted in the odd semester of the 2017/2018 academic year with the population in this study all students of class VII of Junior high School in Serang City. The subjects used were students in Class VII A using

smartphone learning media and students in class VII B using non-media smartphone learning. The hypothesis in the study is that there is the influence of smartphone usage on science conceptual knowledge and student's learnings' independence.

The research instruments used in the study were tests and non-tests. The test in this study is a subjective test in the form of a description question to measure students' science conceptual knowledge in calor matter. The non-test instruments are questionnaires to measure students' learning independence. The instrument used has been tested the instrument of validity, reliability, distinguishing power and the difficulty of using Anatest software. The data obtained were tested for normality first using the Kolmogorov-Smirnov test and homogeneity test using Levene Test. Hypothesis testing using t test. Checking the validity of the data collected using SPSS version 23 software.

RESULTS AND DISCUSSION

Based on the results of data processing from mastery of the science concepts of junior high school students, the effect of smartphone usage in learning can be seen in Figure 1

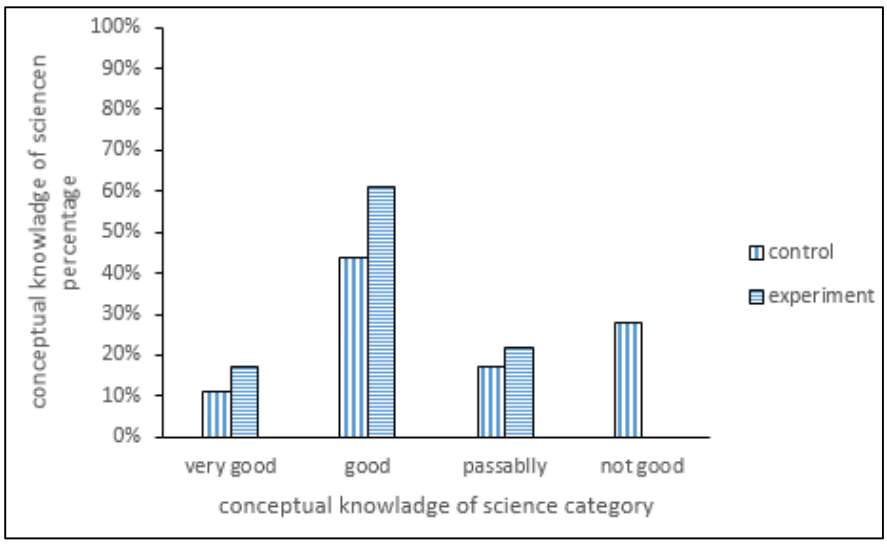

Figure 1. Percentage of conceptual science knowladge of science in junior high school students in the control and experimental classes

Figure 1 shows the percentage of conceptual science knowladge control classes and experiments. The highest category in both the control and experiment classes is good. This means that the conceptual science knowladge of junior high school students is good in learning calor material. However, there is

a difference in the percentage between the control class which is only 44% while the experiment is 61%. In addition, the not good category in the experimental class did not appear. This means that there are differences in the value of the conceptual science knowladge in the control and experimental classes. The use of smartphones in learning has a positive impact when used to dig up information. This is because it makes it easier for students to find information quickly and improve student activities through sharing information obtained. As according to Littlejohn and Foss (2015) the use of smartphones by utilizing various available applications will be able to help meet the students' needs for information.

Based on the results of data analysis with normality test, homogeneity test and hypothesis testing of several research variables, the first hypothesis test analysis was to see the effect of smartphone usage on conceptual science knowladge. The data is obtained from the value of students in class VII in working on the problem description of the heat material.

Table 1. Hypothesis Test of the Effect of Smartphone Use on Conceptual Science Knowledge

Class	N	Normality		Homogenity		t-test	
Control	18	0,111	Normal	0,337	Homogen	0,002	Ha
Exsperiment	18	0,218	Normal				accepted

Based on Table 1, it can be seen that the average value of conceptual knowledge of science in junior high schools using smartphones in calor concept learning is 60.56. Whereas for the control class, which is not using a smartphone in calor concept learning that 46.39. The experimental and control class data were then tested for normality and the results of the significance value were greater than 0.05, which meant the data were normally distributed. Continued by the homogenity test, it was found that the significance value was less than 0.05, which means that the control class and the overall experiment were not homogeneous. Furthermore, to find out the influence of the use of smartphones in calor concept the stages of science-specific knowledge are tested by testing the hypothesis of the data obtained. The results obtained, the significance value is 0.002 where the value is smaller than the significance level of 0.05, which means there is a difference in the value of conceptual knowledge of science between the control class and the experimental class. Based on the signification value, it is likely that there is an influence of the use of smartphones in learning calor concept on science conceptual knowledge. This can be

because smartphones are effectively used in learning. Students become more enthusiastic in learning and the time used is more efficient. This finding is in line with the results of Firmawati (2014) study, which obtained the results of research that Smartphone usage has an influence on the fulfillment of learning resources and there is a functional and significant relationship between smartphone use and fulfillment of learning resources among students.

Smartphones as learning media provide a big role in supporting ICT-based learning (Information and Communication Technology). Junior high school students have been able to find information through the website and share it with group friends or classmates. As stated by Rogozin (2012) the use of smartphones as learning media provides more in-depth learning opportunities for students. This is because with the use of smartphones students can develop learning through searching information from the internet, as well as practicing their skills in carrying out lab work because of the principle of mobility possessed by smartphones. Furthermore it was said that by using smartphones students were able to build their competence in a dynamic manner.

Based on the results of data processing from student independence learning of junior high school students, the effect of smartphone usage in learning can be seen in Figure 2.

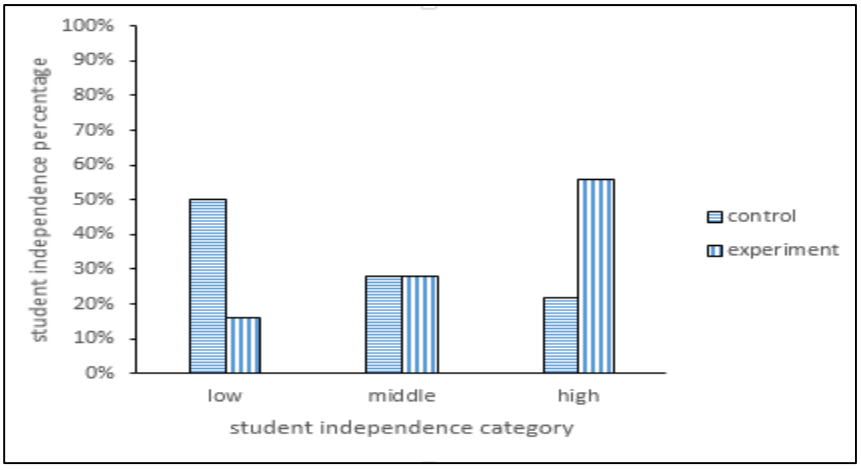

Figure 2. Percentage of learning independence of junior high school students in the control and experimental classes

Figure 2 shows the percentage of learning independence of junior high school students in the control and experimental classes. The highest category of the control class is in the low category which is equal to 50%. Most control class students have low students' learning independence when learning without using a smartphone. The highest category of experimental class is in the

high category that is equal to 56%. Most students in the experimental class have high learning independence with smartphone learning. This shows that there is a difference in student's learning independence in the class which in learning to use a smartphone with a class without using a smartphone Along with the high independence of student's learning, it is possible to increase student's learning achievement. As according to Handayani et al. (2014) and Bidayasari et al. (2013) there is a relationship between learning independence and student's learning achievement, namely the higher the level of independence of students, the higher student achievement.

The next data analysis is about student's learning independence variables associated with smartphone learning with learning that does not use smartphones. Data on student independence is taken using a questionnaire. The results obtained are presented in Table 2.

Table 2. Hypothesis Test of the Effect of Smartphone Use on Student's learning Independence

Class	N	Normality		Homogenity		t-test	
Control	18	0,200	Normal	0,366	Homogen	0,003	Ha
Exsperiment	18	0,139	Normal				accepted

Based on Table 2, it can be seen that the average value of student's learning independence in junior high school using a smartphone in calor concept learning is 62.58. The control class, those who did not use smartphones in calor concept learning were 54.94. The experimental and control class data were then tested for normality and the result was a significance value greater than 0.05, which meant that the data were normally distributed. Continued with the homogeneity test, obtained a significance value smaller than 0.05, which means the control class and the overall experiment are not homogeneous. Furthermore, to find out the influence of smartphone usage in calor concept learning, the stages of learning independence are by testing the hypothesis of the data obtained. The results obtained, the significance value is 0.003 where the value is smaller than the significance level of 0.05, which means there are differences in the value of student's learning independence between the control class and the experimental class. This is reinforced by the results of the observation that the experimental class looks more independent in looking for references during the learning process when compared to the control class. Searching information be easier and more efficient references via internet using a smartphone. As the results of the research by Johanes and Munthe (2014)

get the results of there is influence of the use of internet media on student independence and learning outcomes on problem-based learning.

CONCLUSION

Based on the results of the study it can be concluded that there is influence of smartphone usage on science conceptual knowledge and learning independence of junior high school students. Learning to use smartphones as an effective learning media is used in junior high school. Students become more active in looking for information that is not only fixated on books.

SUGGESTION

Based on the results of the research that has been done, some suggestions put forward are expected that schools can facilitate various innovations developed to improve learning activities in schools so that students can obtain sufficient material resources and can improve learning independence. In addition, the use of smartphones in physics subjects is expected to be an option for teachers to be able to improve student's learning independence, especially for Physics subject teachers. This can make students more interested in learning Physics with the help of media that is interesting and often encountered by students, so students can use it to access any lesson, anytime, anywhere by using a smartphone.

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