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# THE EFFECT OF SCIENCE LEARNING INTEGRATED WITH LOCAL POTENTIAL OF WOOD CARVING AND POTTERY TOWARDS THE JUNIOR HIGH SCHOOL STUDENTS' CRITICAL THINKING SKILLS

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**ABSTRACT**

This study aims to analyze the influence of science learning integrated with the local potential of wood carving and pottery to the critical thinking skill of class VIII SMP students. This research is a quasi-experimental research (quasi-experiment). The research design uses pretest-posttest control group design. The population in this study is the students of class VIII MTs Negeri Piyungan, while the sample is the students of class VIII A and VIII B MTs Negeri Piyungan. The technique of collecting data in this research is in the form of test. The data collection instrument is a critical thinking skill descriptive test. The data were analyzed using ANOVA test. The results of this study indicate that the learning of science integrated with the local potency of wood carving and pottery have an effect on critical thinking skill of class VIII SMP student. This effect is indicated by a significance of 0.008 (significance <0.05).



**Keywords:** science learning; local potential; critical thinking skill

## INTRODUCTION

Indonesia is a country rich in potentials, cultures and natural resources in each region. The potentials of the region in Indonesia is abundant, including the local potential associated with the entrepreneurial world (home industry).

Based on Law no. 20 of 2003 on National Education System (Sisdiknas), it provided an excellent opportunity for teachers as implementers of learning to raise potential local issues into learning. Implementing the integration of local potential into learning is still experiencing difficulties, when the teacher did not understand how to properly integrate the potential of the environment (especially local culture) into the learning process (Alexon, 2010); and the absence of a model of learning that can be adapted by integrating local potential (Suratsih, 2010). Suratsih (2010) disclosed several factors that prevent teachers from utilizing local potentials in learning, which are the huge burden of teaching, lack of adaptable models, facilities, funding and times.

Looking at the current educational developments, teachers should not only provide conventional teaching (teacher center) that is only using lectures and memorization. Students' learning habits with memorization without much thinking made the students overwhelmed when faced with problems that require a further solution; this is seen when students do the descriptive tests. Sometimes the answer did not match the question. So it is with other problems that required reasoning (Asfiah, 2013).

The science subjects in the 2013 curriculum were highly relevant to be integrated with the local contents. However, in reality, science

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learning has not been linked to the local potential around students. Given the importance of this lesson, teachers were expected to choose appropriate methods and approaches in optimizing students involvement in enhancing meaningful learning processes (Syafii and Yasin, 2013). According to Holbrook (2005) in Sha'ban & Insih (2016), he assumed that science learning is irrelevant in the view of students and will be disliked because the emphasis of understanding basic concepts and the basic understanding of science is not associated with matters relating to the environment of students daily life. If it is associated with the environment of everyday life, it will be liked by students so as to provide a meaningful learning experience in students.

According to Suastra et. al. (2011) stated that the 2013 curriculum required the development of science learning in junior high schools in the concept of integrated science, where one of its characteristics is thematic. The right local potential is chosen as the basis for choosing the theme because it is contextual, interesting, and related to real life. The daily local potential is very useful for the life of students and the wider community. The integration of local potential into learning process provided students with the insight into the local potential and local wisdom values (Wilujeng, 2016). It is consistent with the opinion of Ridlo (2005) which stated that the approach of the Exploration of Surrounding Environment (JAS) is an approach that utilized surrounding environment as a learning object. The JAS approach is a learning approach that utilized the natural environment around the students' life, whether physical, social, technological, or cultural as the object of science learning which phenomenon is learned through scientific work (Marianti & Kartijono, 2005).

To overcome the problems of degradation of young people's respect for the potential of the region and to form students who have a comprehension of the nature of science as a whole can be started by improving the learning process associated with local potential around the students. It is inconsistent with the science learning standards that emphasized on the inquiry activities and doing so that it can help students to gain a deeper understanding of the surrounding environment (Kubicek, 2005).

Local excellence (local potential) is anything that could be a region's characteristic that included the products of the earth, art creations, traditions, cultures, services, natural resources, human resources, or others that are the excellence of a region (Kanzunnudin & Oktavianti, 2014). The local potential is a resource that resided in a particular region (Hatimah, 2006). The local potential in Kasongan Village, Bantul Regency is the wood carving and pottery. The local potential of wood carving and pottery can be used as a science learning resource. The local potential of wood carving is an industry that required the basic material of woods to be processed into various household furniture products, such as tables, chairs, cabinets, beds, and some wooden souvenirs. The local potential of pottery is an industry that made tools by using raw materials from clay or clay soil.

The local potential of pottery in Kasongan Village, Bantul Regency came from natural resources such as clay. The soil used as the basic material for making pottery is processed through several stages. The stage of making pottery consisted at least of soil taking, soil preparation so that the soil became smooth and fine, the formation of pottery using traditional rotary technique, drying using room temperature, gradually burning heating up to 1200 $^0$C, and finishing when alleviating under conditions still smoldering from the stove while doing staining using a wall paint (Anisa, 2016).

There are several stages of wood processing in the furniture industry, they are the preparation stage: the selection of good wood materials for the basic materials of furniture making; drying stage: wood dried by drying in the sun; the stage of forming the furniture section to be made: the cut / sawed wood formed the pieces of furniture to be made; the first stage of smoothing / sanding: each piece of furniture is smoothed by means of sandpaper; the gluing stage: each piece of furniture is strung together into a raw furniture product; the second smoothing stage: the crude furniture is refined until it is completely smooth and ready to be painted or stained to a mature furniture; and finishing stage: the crude furniture that has been smoothed is painted or plastered into a final furniture product (Anisa, 2016).

The existence of Kasongan Village, Bantul Regency in Yogyakarta that has many local potentials can be utilized and integrated into the process of science learning in all levels of education, including science materials in the curriculum of 2013 class VIII junior high. Strategies for integrating local potentials in learning can be done by modifying learning indicators (Santoso, 2010). The learning of science integrated with local potential is a science learning that utilized the local advantages or potentials in a region as a source of learning. Many learning materials can capitalize on the local potential in the environment around

the school, especially science learning materials. Science should be viewed as a way of thinking for the purpose of understanding nature, as a way of investigating to state the phenomenon, and as a body of science resulted from inquiry (Collete & Chiappetta, 1994). The learning process of science as part of the education system used a scientific and contextual approach to making the knowledge more meaningful. This meaningful learning will be felt when the preparation of learning is done with paid much attention to the needs and involvement of students maximally.

Science learning is expected to foster the character of students to be more appreciative of the cultures and resources around them (Khusniati, 2014). In science learning, it is emphasized in the process of suppression of direct experience to develop the ability so that students can explore and understand the surrounding environment (local potential) scientifically by finding out and do or interact directly. It helped students to gain a deeper experience of the surrounding environment in the form of facts, concepts, principles, natural laws, models, and theories that shape knowledge. This in-depth experience will be gained by engaging in the relevant environmental-related (local potential) science learning (Anisa, 2016).

According to Swarabama, et al. (2013) stated that learning should prioritize on the processes and thinking skills, such as defining and analyzing problems, formulating principles, observing, clarifying and communicating. According to Tawil & Liliasari (2013) stated that critical thinking is the ability to say things with confidence because critical thinking allowed students to solve problems, evaluate and infer from sources found in phenomena, events, and pieces of information around them every day so that the implementation of critical thinking skills in science learning must conform to the nature of the science lesson material related to natural phenomena and daily events. Critical thinking skills are part of high-order thinking skills (Uswatun & Rohaeti, 2015).

Johson (2009) in Muskitta & Djukri (2016) stated that critical thinking is a clear and directed process used in mental activities, such as problem-solving, decision-making, analyzing assumptions, conducting scientific research and training students to have the ability to argue in an organized manner and can systematically evaluate the value of personal opinions and opinions of others. According to Naomi & Zuhdan (2016), the ability to think critically is a process of thinking ability to produce rational decisions by executing the process of digging, recognizing, and assessing all matters related to being considered in decision making. The process involved the ability to analyze, synthesize, identify and solve problems, conclude and evaluate so that it can be used as a result of students science learning.

Rudd, Baker & Tracy (Cavus & Uzunboylu, 2009) revealed that critical thinking is a reasonable, purposive, and introspective approach to solving problems. According to Quitadamo, et al. (2008) stated that critical thinking skills influenced students' academic and professional success or success in the future. Critical thinking skills are critical to being trained and developed in students so that they can make decisions and solve problems, whether in school, private life, or in the working environment later on. These critical thinkers are expected to be the agents of change and answered to the challenges of the 21st century that can bring this country towards a better future (Syarifah & Sumardi, 2015).

Afrizon, et al. (2012) argued that there are five aspects or categories of critical thinking skills, namely: provide a simple explanation, build core competencies, conclude, provide further explanation, and strategies and tactics. According to Ennis (1991) in Fakhriyah (2014) stated that the characteristics of critical thinking skills, namely: (1) seeking a clear statement of each statement; (2) finding an excuse; (3) trying to know the information properly; (4) using a credible source and mention it; (5) taking into account the overall situation and condition; (6) trying to remain relevant to the main idea; (7) recalling the original and fundamental interests; (8) looking for alternatives; (9) behaving and thinking openly; (10) taking a position when there is sufficient evidence to do something; (11) seeking as much explanation as possible; (12) being systematic and orderly with parts of the whole problem; and (13) being sensitive to the level of knowledge and skills of others.

According to Nuraida (2016), she stated that critical thinking skills are derived from three aspects, namely: interpretation, analysis, and explanation. A total of 11 critical thinking aspects is used as indicators of critical thinking skills in research, which include: linking, interpreting, comparing and differentiating, grouping and classifying, sorting, prioritizing, analyzing, detecting biases, evaluating, making conclusions, and explaining (Hartini & Sukardjo, 2015). The indicator of critical thinking skills according to Uswatun & Rohaeti (2015) is linking, comparing, classifying, analyzing, interpreting, valuing, concluding, and being aware of the environment. Hairida (2016) stated that "aspects of critical thinking skills are giving the simple explanation, building basic

skills, and making the decision." According to Pratiwi (2016), she stated that "eight indicators from Ennis developed into an instrument of test item includes: (1) defines the term and consider the definition of the appropriate criteria; (2) ask and answer questions that require an explanation; (3) focused questions; (4) to interact with others; (5) inductions; (6) observe and consider the results of observation; (7) show or make assumptions; and (8) to deduce and assess the results of deduction ".

Based on the description above, there are some similarities in the aspect of critical thinking skills, but this study used five aspects of critical thinking skills, namely: providing a simple explanation, connecting skills, comparing and differentiating, analyzing and evaluating, and creating and conveying conclusions.

The purpose of this research is to analyze the influence of science learning integrated on the local potential of wood carving and pottery to the critical thinking skills of students in SMP class VIII.

## METHODS

This type of research is a quasi-experimental research which aims to analyze the influence of two different treatments to the research subject. The research design used is Pretest-Postest Control Group Design.

This research was conducted in the odd semester of academic year 2016/2017. This study was conducted in MTs Negeri Piyungan.

The subject of this research is the students of class VIII MTs Negeri Piyungan in the academic year of 2016/2017 semester 1. This school is one of the schools that have implemented the 2013 curriculum.

This research was conducted by the quasi-experimental method. The population in this study is all students of class VIII MTs Negeri Piyungan. The sample is determined by cluster random sampling of 6 existing classes; it is obtained that class VIII A is the experimental class and class VIII B is the control class.

Learning in this research is done by using learning tools based on local potential of wood carving and pottery in the form of RPP and assessment instrument based on local potential of wood carving and pottery at KD 3.3., which described the interrelationship of the nature of the material and its utilization in everyday life, as well as the influence of the use of certain materials on human health. The tools and learning instruments used in this study are adapted from the learning tools developed by Anisa (2016).

In the experimental class, teachers implemented learning using science learning tools integrated on the local potential of wood carving and pottery, whereas in control class, teachers carried out the learning process using commonly used learning tools (conventional).

The design model in this quasi-experimental study is the pretest-posttest control group. The students in both experimental and control classes were given pretest and posttest before and after treatment in the form of critical thinking skills. These critical thinking skills are in the form of questionnaires of 20 questions.

The technique of collecting data used in this study is testing techniques. The instrument used in data collection is in the form of test description which amounted to 20 questions to measure the critical thinking skills of class VIII SMP students.

The technique of data analysis used is descriptive analysis and inferential analysis using SPSS version 20 with the significance level of 0,05. Descriptive analysis is used to present the data of critical thinking skills in the experimental class (science learning integrated on the local potential of wood carving and pottery) and control class (conventional science learning) that have been obtained from pretest and posttest scores. The data analysis of critical thinking skills used in this study was average, highest score, lowest score, variance, and standard deviation.

In addition to the descriptive, analytical techniques, an inferential analysis is also conducted by using ANOVA to analyze the effect of science learning integrated on the local potential of carving wood and pottery to the critical thinking skills of class VIII SMP students. However, before ANOVA test, the prerequisite test is performed in the form of normality test and univariate homogeneity test. Normality test is used to find out whether the data come from the normally distributed population or not, while homogeneity test is used to determine whether the population of both groups is homogeneous or not.

The normality test is done on the pretest data of critical thinking skills which have been calculated with the hypothesis as follows:

$H_0$: The data from the population that is normally distributed.

$H_a$: The data from the population that is not normally distributed.

The normality tests were performed in each class, both experimental and control classes. The Kolmogorov-Smirnov normality test was performed using the SPSS 20 program at a 0.05

significance level. The criteria for performing a normality test at a significance level of α = 0,05 is data derived from a normally distributed population or H0 accepted if the value of significance is greater than the value of α (.>).

The homogeneity test is conducted to find out whether the population of both groups is homogeneous or not.

$H_0$: The population of both groups is equal or homogeneous.

Ha: The population of both groups is not equal or not homogeneous.

The Levene's Homogeneity Test was performed using SPSS 20 program at a significance level of 0.05. The criterion for conducting homogeneity test at level α = 0.05 is the population of both groups being equal or homogeneous, or $H_0$ has accepted if the value of significance is greater than α value α (.>).

After the two assumption tests above were met, then to analyze the influence of science learning integrated on the local potential of wood carving and pottery to the critical thinking skills of class VIII SMP students by using ANOVA.

The ANOVA hypothesis is as follows:

$H_0$: The science learning integrated on the local potential of wood carving and pottery had no effect on the critical thinking skills of class VIII SMP students.

Ha: The science learning integrated on the local potential of wood carving and pottery influenced the critical thinking skills of class VIII SMP students.

The ANOVA test was performed at 0.05 significance level with the help of SPSS 20 program. The acceptance or rejection criteria of H0 $H_0$ at the 0.01 significance level are:

a. $H_0$ is rejected if .<.

b. $H_0$ is accepted if .>.

## RESULTS AND DISCUSSION

The results of the pretest and posttest descriptive analysis as a whole are shown in Table 1. Table 1 showed that the average pretest of critical thinking skills in the experimental class (54.83) is greater than the control class (54.33), and the posttest average of critical thinking skills in the experimental class (79,51) is larger than the control class (75,81).

Based on the analysis, it can be seen that the average increase of students critical thinking skills of the experiment class is higher than the control class. This increase is due to the direct experience of student interaction with the pottery and furniture artisans who make the critical thinking skills that students have become more excavated. Students became freer to ask about things they had not known before and made learning science more interactive and more meaningful. It is in line with the opinion of Machin (2014) which stated that the observation method is useful for the curiosity of the students so that the learning process has a high significance. It also agreed with Anisa (2016) who disclosed that science learning integrated with local potential would provide the students with an in-depth experience by engaging actively in the relevant environmental-related science (local potential) learning.

**Table 1**. The Results of Descriptive Analysis of Pretest and Posttest on the Critical Thinking Skills

| Description | Experimental Class | | Control Class | |
|---|---|---|---|---|
| | pre-test | post-test | pre-test | post-test |
| The Number of the Subjects | 32 | 32 | 30 | 30 |
| Highest Score | 68.89 | 94.44 | 67.78 | 87.78 |
| Lowest Score | 40.00 | 67.78 | 41.11 | 67.78 |
| Average | 54.83 | 79.51 | 54.33 | 75.81 |
| Variance | 66.56 | 29.78 | 64.32 | 26.88 |
| Standard Deviation | 8.16 | 5.46 | 8.02 | 5.18 |

The data of pretest and posttest of the critical thinking skills between the experiment class and control class also indicated that there is a different increase. The average comparison graph of the pretest and posttest scores on the critical thinking skills data between the experiment class and the control class is presented in Figure 1.

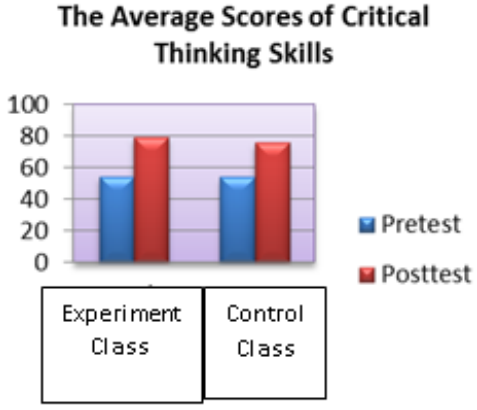


**Figure 1**. The Average Comparison of Pretest and Posttest of Critical Thinking Skills between Experiment Class and Control Class

Based on Figure 1 it can be concluded that the average pretest and posttest in the experiment class is higher than the control class.

Before the ANOVA test, a univariate assumption test is required. The univariate assumption test is the normality test and homogeneity test.

The Kolmogorov-Smirnov univariate normality test was performed on pretest data of critical thinking skills in experiment and control classes with SPSS 20 program. Based on the analysis of the normality test, it is obtained that the data came from the normally distributed population or $H_0$ is accepted with .> at the significance level of 0.05. The normality test results are presented in Table 2.

**Table 2**. The Results of Normality Test

| Dependent Variable | The Pretest Data of Critical Thinking Skills | |
|---|---|---|
| | Sig. | Conclusion |
| Control Class | 0.058 | $H_0$ is accepted |
| Experiment Class | 0.094 | $H_0$ is accepted |

The homogeneity test was performed using Levene's Test with the help of SPSS 20. The homogeneity test of the data can be concluded that the sample data that came from a homogeneous population if H0 is received with > α at a 0.05 significance level. The homogeneity test result showed the sample data came from the homogeneous population. The univariate homogeneity test result is presented in Table 3.

**Table 3**. The Result of Homogeneity Test

| Dependent Variable | The Pretest Data of Critical Thinking Skills | |
|---|---|---|
| | Sig. | Conclusion |
| Critical Thinking Skills | 0.861 | $H_0$ is accepted |

The Levene's homogeneity test had also resulted in the conclusion that the sample came from a homogeneous population. Thus an ANOVA test can be performed. The result of ANOVA test on posttest data of critical thinking skills is presented in Table 4.

Based on the data, it can be concluded that the science learning integrated with the local potential of wood carving and pottery have an effect on critical thinking skill of class VIII SMP students. It is because the learning activities and visits made by students to the local potential of wood carving and pottery in Bantul District as part of the learning process of science made students more active, and more critical in obtaining information directly from the craftsmen of wood carving and pottery. The science learning integrated with local potential provided a different experience for students and made learning more contextual and meaningful and provided a deep understanding for students. It is in line with the opinion of Anisa (2016) stated that science learning based on the local potential of wood carving and pottery is effective to improve the critical thinking skills of class VIII SMP students.

**Table 4**. The Result of ANOVA Test

| Dependent Variable | The Posttest Data of Critical Thinking Skills | |
|---|---|---|
| | Sig. | Conclusion |
| Critical Thinking Skills | 0.008 | $H_0$ is rejected |

## CONCLUSIONS

Based on the results of the research and discussion above, it can be concluded that the science learning integrated with the local potential of wood carving and pottery influenced the critical thinking skills of class VIII SMP students. This effect is indicated by a significance of 0.008 (significance <0.05).

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