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Exploring Local Potency of Purbalingga Regency to Improve Creative Thinking Skill of Elementary School Students

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Abstract

The observation results at 27 elementary school students indicate that the learning process did not yet support the development of students' creative thinking abilities. Students who recognize cultural diversity will tend to have creative thinking ability. Unfortunately, culture utilization as a source of learning in the school was not optimal, so students were less familiar with the culture in their area. But, creative thinking through learning Project-based Learning (PjBL) model by using local wisdom resource will help students to improve their abilities. This study aims to determine the application of PjBL with science aspects related to community culture (ethnoscience) and the creative thinking abilities improvement of elementary school students. This experimental research design used a pre-test and post-test design control group. The research sample consisted of students fifth-graders Public Elementary School 2 Majasari and Public Elementary School 3 Majasari. Data collection used observation techniques, written tests, questionnaires, and documentation. The positive findings in the normalized gain test analysis of the experimental class and the control class showed a moderate increase of 0.4 and 0.3. The increase in students' creative thinking abilities in the experimental class was higher than in the control class. The results of the study concluded that the application of ethnoscience based PjBL could improve students' creative thinking abilities.

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INTRODUCTION

The implementation of Curriculum 2013 as an effort to foster the golden generation in 2045 to be smart and characterized a society. Character education has a major role in preparing the best generation. Character education application is carried out through the implementation of local knowledge. Rule of Education and Culture Ministry Number 21 of 2016 contains the Standard Contents which are based on the existence of cultural diversity in Indonesia. Education must facilitate students to introduce the local culture and implement a loving local culture attitude in their area.

Sciences (IPA) in elementary schools is a science that is intended to make students have the knowledge, ideas, and concepts gained from experience. Understanding and using science concept in everyday life and simple technology is the goal of education (Rusilowati, 2015). One of the right aspects to be integrated into the science learning process is the local potential that is the advantage of each region. This is following the mandate of the National Education System Law Number 20 of 2003 concerning the National Education System which explains that the curriculum needs to develop the local potential to respond to the needs of each region. Local potential in learning can be related to science material in elementary schools. This is in line with Wilujeng (2016) research, integrating the regional potential into learning will provide students with insights related to local potential and values of local wisdom.

Purbalingga Regency has a characteristic that can be identity and national identity. Based on social culture, Purbalingga Regency is identical with various potential social interactions, languages, special food, and cultural arts. One of the characteristics of Purbalingga Regency in terms of typical food. Mendoan is one of Purbalingga local potentials made from soybeans. The Mendoan characteristics from Purbalingga Regency come from soybeans which are made into very thin sheets of soy cake and covered with flour mixture mixed with chives. Soy cake is deep-fried and served warm.

The process of making soy cake is obtained from generation to generation by the people of Purbalingga using the scientific principle. This means that the process of making soy cake is related to learning activities in elementary schools. Based on the results of a preliminary study of one school in Purbalingga Regency, students' appreciation of the local potential is not good. Students do not understand the process of making soy cake in Purbalingga regency. The existence of soy cake production houses around the residence of students has not been well utilized as a learning source in elementary schools. The application of the ethnains-based PjBL model is thought to be the solution to overcome the problem.

According to Atmojo (2012) culture is the whole way of life of the community, which is not only about some of the ways of life that are considered higher and more desirable. Culture is a way of life that is developed and shared by a group of people and is passed down from generation to generation. The process of making traditional food is part of a cultural example, for example, the process of making soy cake down and down in Purbalingga Regency.

Atmojo research (2012) states that ethnics-based science learning that links learning with community culture will increase students' appreciation of the culture of the community. With ethnoscience, students can understand the concept of science as a result of research conducted by Arfianawati, Sudarmin, and Sumarni (2016) which shows that ethnoscience can improve cognitive abilities and students' creative thinking.

The production house in Purbalingga regency can be used for ethnics-based Integrated Science learning. Learning the process of making soy cake related to science learning Theme of 7 Events in Life, Subtopic 2 National Events Regarding the Proclamation, and Basic Competencies (BC) 3.7 Analyzing the effect of heat on changes in soy cakerature and form of objects in everyday life. This competency requires students to be able to understand the concept of heat change in everyday life. Also, students must have creative thinking abilities to analyze the heat

effects associated with the process of making soy cake.

Creative thinking abilities is a process that gives rise to new ideas. According to Munandar (2012) there are four aspects to assess students' creative thinking abilities, namely thinking fluently, thinking flexibly, original thinking, and valuing skills.

Achievement of learning objectives requires the selection of appropriate learning models. Project-based learning (PjBL) is expected to be able to achieve competencies that are appropriate for the development of science and technology. PjBL learning trains students to solve problems by utilizing the surrounding environment through projects. Based on research conducted by Mihardi, Harahap, and Sani (2013) students' creative thinking skills are more effective when using project-based learning models compared to creative learning models.

Based on the background of the problems that have been described, researchers are interested in improving creative thinking skills through learning ethnics-based PjBL in elementary schools.

METHODS

Based on the problems and the objectives, this qualitative research used the experimental method. The design is pre-test and post-test control group design to test the effectiveness of PjBL with ethnoscience content to creative thinking ability of the students.

The subjects were fifth graders of Elementary School Purbalingga. The data was collected by observation, written test, and questionnaire. The instruments were observation sheets of the learning process and creative thinking ability of the student. The data obtained consisted of quantitative data analyzed using N-gain scores to get an increase in students' creative thinking abilities.

RESULTS AND DISCUSSION

This research was done for 27 - fifth graders grouped into an experimental group and 29 fifth graders grouped into the control group. Based on the observation data, their creative thinking abilities are shown in figure 1.

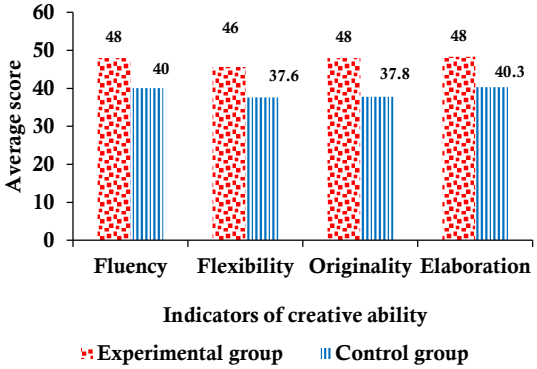

Figure 1. Creative Thinking Ability (CTA) Score

The figure shows the CTA of the students during PjBL implementation with ethnoscience content had reached a creative category. The orders of the experimental group's CTA scores from the highest were elaboration, fluency, originality, and flexibility. The CTA of the experimental group was higher than the control group. It indicated that the implementation of PjBL with ethnoscience was more effective and significant in improving the CTA of the students. Subali, Sopyan, and Ellianawati (2015) found that local wisdom based-science learning development could improve positive characteristics and learning achievements at Elementary School. Setiawan, Innatesari, Sabtiawan, and Sudarmin (2017) argued that local wisdom based-science module development could improve students' scientific literacy.

The implementation of PjBL motivated the students to be more active. It was in line with Insyasiska, Zubaidah, and Susilo (2015) stating that PjBL could influence students' creativities about 31.1%. It developed fluency of thinking. The students also trained to collect ideas in solving problems through the project, such as to determine objectives, problem formulation, hypothesis, material and instrument selection, and standard operating procedures to make creative products. Their flexibilities to produce ideas were also developed by this project. The students were given a chance to think about

various notions to solve the formulated problems. The produced ideas might be unique (originality) since teacher as facilitator and motivator did not limit their thought in solving problems.

Pamungkas, Bambang, and Linuwih (2017) stated that the current developed ethnoscience integrated learning model in learning science is worth to be implemented in learning. It could improve learning achievement and creative thinking ability of the students. Taufiq, Dewi, and Widiyatmoko (2014) and Khusniati (2014) stated that higher students' learning quality higher environmental awareness behavior. Effective learning shows achievements of the objectives seen from students' mastery levels on the learned concepts.

Characteristics of PjBL with ethnoscience content and common PjBL could be seen in teaching-learning process observation. It was done three times in fifth grade for both groups. The observer had to observe the learning process using observational sheet. The teaching-learning process of both groups is shown in figure 2.

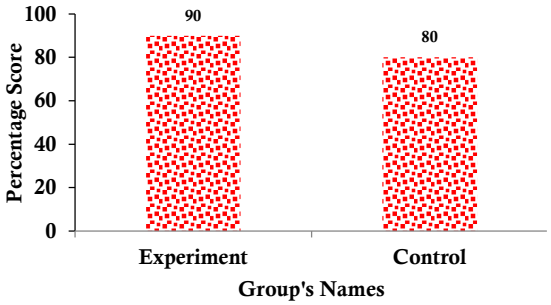

Figure 2. Teaching – Learning Process Observation Result

The figure shows the implementation of PjBL in the experimental group was categorized very well with percentage of 90%. It was conducted within 6 phases in 3 meetings.

The score of PjBL process in the control group reached 80%, categorized well. The first meeting was started by problem orientation phase for the students about the history and development of soy cake. The observation result of this step showed some of the students were active in learning. The second observation result showed poor attention of the students to understand the history and development of soy cake.

On investigation phase, students collected information dealing with the text. The teacher gave them a chance to ask, but they were passive. The result showed the situation had not reached the fourth phase developing and presenting the result.

The fifth phase was analyzing and evaluating the investigation. The students observed a video to share information and work on the post-test question. They needed more direction, motivation, and explanation to be actively involved in group discussion.

The success of PjBL model with ethnoscience content on theme seven could improve CTA of the students. It is in line with Sarwi, Supriyadi, and Sudarmin (2013) asserting that the success of science learning process at school was determined by the cultural background of the students or surrounding society at school.

Ariningtyas, Wardani, and Widhi (2007) stated that implementation worksheet with ethnoscience content could improve the content aspect of the experimental group and was effective to be implemented in learning. Sudarmin, and Rahayu (2015) stated that the science module integrated by ethnoscience was effective to use in science learning. Meanwhile, Aydinli, Dokme, Ünlüa, Öztürk, Demir, and Benli (2011) stated that there were differences in science, conceptual understanding levels. A higher level of students leads to higher science conceptual understanding.

Creative thinking ability of the students was obtained from a multiple-choice test with reasons. It was given for the fifth graders after the intervention for both groups. The N-gain test showed CTA of the students were categorized high, moderate, and low. The score based on observation in both groups is shown in table 1.

Table 1. Creative Thinking Ability (CTA) Score Results

N-gain criteria	Numbers of the students	
	Experimental group	Control group
High	5	0
Moderate	20	21
Low	2	8

The numbers of moderate and low category students in the control group were higher than the experimental group. It was not found any high categorized students in the control group. The N-Gain score of experimental and control groups was categorized moderate since they got 0.4 and 0.3. The data was obtained from multiple-choice questions with reasons which were given after learning.

The questionnaire was used to find out the CTA of the students, started from fluency, flexibility, originality, and elaboration. The questionnaire result was calculated by using the already determined procedure. The self-assessment result of the students' CTA could be described from the score of the questionnaire in figure 3.

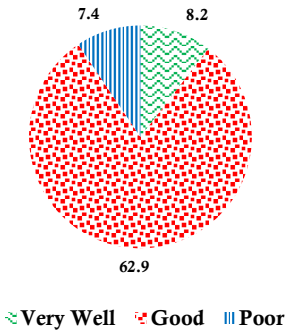

Figure 3. Creative Thinking Ability (CTA) Questionnaire Result

The results showed 27 students had three achievements: very well, good, and poor. Fluency indicator was closely related to numbers of notion or answers by the students. PjBL with ethnoscience gave the students a chance to deliver answers and notions of their thought.

Flexibility aspect meant that the students had initial answers in solving problems or questions. Several of them were capable of producing more than one answer although it was from similar or poor concept variances.

On originality or uniqueness indicators, there were some of the students found a different conceptual method to answer or solve the questions. It meant they had been capable of fostering new problem solution based on their experiences or other concepts from other people.

The project process to produce soy cake was done while visiting soy cake home-industry in Majasari village. The natural package of soy cake from leaves was still used. There were several influential factors to the growth of the fungi and fermentation process, such as light intensity, air circulation, and humidity. The period of fungi growth showed a level of ripeness. Based on the students' observations, the period of ripeness for plastic and leaf packages were different, as shown in figure 4.

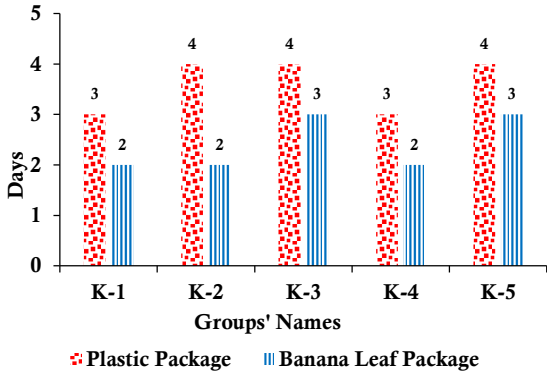

Figure 4. Ripeness Period based on Packages

Based on the figure, the natural environment and culture used on the process of making soy cake showed the growth of fungi of banana-leaf packaged soy cake was faster than the plastic package. It is in line with Sayuti (2015) showing that package had a significant influence on soy cake quality.

Banana-leaf packaged soy cake had faster fungi growth since it was light-impenetrable. Thus, oxygen circulation was easy to get inside and outside. The humidity was kept properly. Therefore, light intensity, air circulation, and humidity became factors influencing growth of fungi of the soy cake during the fermentation process.

In another hand, plastic-packaged soy cake was light-penetrable and humid. Its air circulation was depended on the numbers of wholes created by the students. It was noticed that banana-leaf packaged soy cake had higher protein and fat values than the plastic packaged soy cake.

The project product of the learning was soy cake. The realization of the students' creativities

was seen on soy cakes which were differently produced. The teacher gave a chance for them to package the soy cake based on their interest. The realizations of the students' creativities upon the product are shown in table 2.

Table 2. Realization of the Products

Names of the group	Banana – leaf package	Plastic package
K-1	Rectangle	Square
K-2	Triangle	Parallelogram
K-3	Triangle	Circle
K-4	Square	Rectangle
K-5	Circle	Triangle

Based on the product realizations, they did not correlate to the growth period process of fungi ripeness on the soy cakes. The influential factors of fungi ripeness were humidity, light intensity, and air circulation of the packages. Varieties of the product realizations showed the students' creativities. It is in line with Yuliana (2017) that ethnoscience based learning could improve scientific thinking ability about local wisdom.

CONCLUSION

Research findings show that students' creative thinking abilities have increased moderate and creative. Positive findings on research that learning that explores, implements, and preserves local potential can build the identity and character of cultured students. Locality insight with cultural diversity can create unity and diversity character in each region. This means that PjBL learning model with ethnoscience can improve students' creative thinking abilities.

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