

THE IMPLICATIONS OF LOCAL CULTURAL VALUES IN LEARNING MATHEMATICS

Eka Sulistyawati

*Mathematics Education Students, Graduate School
Yogyakarta State University, Indonesia
Email address: sudirmaneka@gmail.com*

Abstract

As one of the efforts to preserve the local culture, Yogyakarta government puts cultural values in education that is placed on three things, first: cultural values as reinforcing aspects of educational goals, second: cultural values as a good approach in the implementation and management of education, third: cultural values as the content or payload education.

To support government programs should be a learning approach that combines cultural values as the content of the learning process. One approach that can be combined with the values of the culture is a contextual approach. Therefore the aim of this paper is to describe the mathematics learning with contextual approach which raised the local cultural values, especially in the circle material.

The steps of mathematics learning with contextual approach that combines local cultural values are as follows: (1) Relating local cultural events associated with the material to be learned through the videos or pictures. Cultural events used are various kinds of batik motif that have geometric shapes such as circles, traditional games, legends, traditional arts and ceremonies. (2) Experiencing means student learning activities with worksheets, teachers as a model to demonstrate the material being studied. (3) Applying mathematical concepts to solve meaningful problems associated with the local culture. (4) Cooperating means students work together to solve and discover mathematical concepts, and (5) Transferring, students use the knowledge gained in the new context.

Keyword: Contextual, culture, circle.

INTRODUCTION

In order to students can save impression longer and cause a sensation, teacher must require close observational objects to students. By close observational object, students know real life event related to subject matter. Thus, it will create a meaningful mathematics learning process. With meaningful learning, students will discover the relationship between the object being analyzed with learning material that is used by the teacher.

One of the events that close to students and can be used in learning is an event that associated with the local culture. The selection of using local culture in learning based on Peraturan Gubernur Daerah Istimewa Yogyakarta No. 77 of 2012 of the Strategic Plan of Regional Education Development which states that the education vision development is to make DIY as a center of education-based culture in South East Asia in 2025. The placement of cultural values in education is put on three things, first : cultural values as reinforcing aspects of educational goals, second : cultural values as a good approach in the implementation and management of education, third : cultural values as the content or payload education.

In addition to the DIY educational vision above, the use of local cultural values have a reason that the local culture is a culture that is *adiluhung*. *Adiluhung* means of high quality, valuable, and should be maintained. Therefore, the use of local culture in mathematics learning is an efforts to preserve the local culture so that Indonesian people do not leave the area of

culture. This is due, the local culture has begun to be forgotten and not recognized by the Indonesian people in general and students in particular. Though local culture has value and higher quality than modern culture. For example, the game "*benthik*" is a traditional game that has educational value when viewed from cognitive, motoric, and social aspect. Viewed from motoric aspects, *benthik* train players to perform movements such as running, throwing, catching, etc. When viewed from the social aspect, this game teach the players to interact among each other (play along). While the cognitive aspect, this game trains players to estimate the distance, perform arithmetic operations addition, subtraction, introducing a unit of length, etc. Based on these examples, it should be realized that the Indonesian culture has the great value that gives a lesson, moral, and useful meaning in human life.

To support the vision of education province, there should be a learning approach that incorporates cultural values as the content of the learning process. One approach to learning that can be combined with cultural values as the content of the learning process is a contextual approach. Mathematics learning process that uses a contextual approach load step of relating. In the process of relating, learning material related with events the local culture through video or image. So expect the local culture associated with the material being studied can be recognized again by the students and the students can find out the relationship of local cultural events with the material being studied.

Based on the background above, some problems can be formulated as follows :

1. What are some of the local culture used in mathematics learning with contextual approach that applies the values of the local culture ?
2. What steps mathematics learning with contextual approach which combined with the local cultural values ?

So, the objectives of this research are:

1. To describe a wide variety of local cultures that are used in mathematics learning with contextual approach.
2. To describe the steps of mathematics learning with contextual approach which raised the local cultural values

The results of this paper are expected to be useful for teachers, schools, and researchers as written below:

1. Theoretically, can enrich the knowledge about the application of contextual approach based on local culture in mathematics
2. In practice:
 - a. For mathematics teachers, the results of this study can be used as an illustration of how to apply mathematics learning with contextual approach that combine with local cultural value.
 - b. For schools, the results of this study can be used as an input in determining the programming steps curriculum, especially in the provision of facilities for teachers who will carry out the contextual approach that combine local cultural value.
 - c. For other researchers, the results of this research can be developed to carry out further research on other aspects of mathematics learning.

EXPLANATION

Contextual learning based on the philosophy of constructivism (Komalasari, 2010: 15). Elliot, et al (2000: 15) states that constructivism means that students construct their own knowledge. In the learning process, students must find their own and transform complex information, check the new information that received and then adjust the knowledge that already exists. In addition, the Depdiknas (2002: 3-5) suggests the characteristics of the learning process is based on the philosophy of constructivism are as follows:

1. Students construct their own knowledge through problem-solving activities, find something useful for him, and connecting ideas into knowledge and deep understanding.
2. Students experience the learning process to determine how the knowledge can be obtained.
3. The teacher is facilitating students to find and apply the idea to connect the knowledge of known and unknown knowledge students.
4. The student-centered learning by establishing a learning community in the form of group work.

Furthermore, Sears (2001: 2) states that "Contextual Teaching and Learning (CTL) is a concept that helps teachers relate subject matter to real world Situations". This means that contextual learning is a concept that helps teachers to connect the subject or learning material to real world situations. In line with Sears's opinion, Johnson (2002 : 3) found that

Contextual teaching and learning is a system of instruction based on the philosophy that students learn when they see meaning in academic material, and they see meaning in schoolwork when they can connect new information with prior knowledge and their own experience.

Johnson's opinion has a meaning that contextual learning is a system of learning that is based on the philosophy that students learn when they see the sense in academic materials, and they see the sense in school activities when they can connect new information with existing knowledge and experiences. Hence, in contextual approach very important the relationship between new information with students' experiences that owned by the students in the learning process. Furthermore Johnson (2002: 3) state that

By making these connections, students see meaning in schoolwork. When students formulate projects or identify interesting problems, when they make choices and accept responsibility, search out information and reach conclusions, when they actively choose, order, organize, touch, plan, investigate, question, and make decisions to reach objective, they connect academic content to the context of life's situations, and in this way discover meaning.

This means that by making the relationship between new information with already student's experience, students will see the sense in school activities. When students formulate a project or identify interesting problems, make choices and accept responsibility, looking for information and came to the conclusion, when they actively have involve, organize, touch, plan, investigate, question, and make decisions to achieve the goals, they are connected with academic content with life context situations, and in this way the students find meaning. Understanding learning with contextual approach proposed also by the Kamariah et.al (2011: 2) which states that

In the first project by the Ohio State University College of Education and Bowling Green State University, the definition of the contextual teaching and learning was developed as the conception of the teaching and learning that helps teachers relate subject matter content to real world situations and motivates students to make connection between knowledge and its applications to their lives as family members, citizens, and workers; and engage in the hard workthat learning requires (National Conference on Teacher Quality, 2000).

These opinion states the definition of contextual learning was developed as a concept of teaching and learning that helps teachers connect course content to real world situations and to motivate students to make connections between knowledge and its application in their lives as family members, citizens, workers, and the hard work involved in learning needs. Based on expert opinion above, it can be concluded that learning with contextual approach is a learning

based on the philosophy that students learn when they see the sense in academic materials, and they see the sense in school activities when they can relate new information to knowledge existing as well as their own experiences. So that students actively have order, organize, touch, plan, investigate and make decisions to achieve the goal. In this way students discover the meaning of a series of teaching learning process.

To create learning which is based on the philosophy of constructivism, it is important for a teacher to know the learning steps to be done to facilitate student learning process as mentioned above. Crawford (2001: 9) emphasizes 5 steps in learning to be done by teachers, including:

1. **Relating**
Relating is the most powerful strategy in contextual learning. Relating is learning that is associated with a person's life experience or prior knowledge. In relating process, teachers can providing and linking issues or events that are close and possible ever experienced by students that have relationship with the lessons learned. Thus, there will be interest in students to learn mathematics.
2. **Experiencing**
In the learning process, students should build their own knowledge. This is done in order to create a process of student-centered learning, and the learning process that facilitates communication between students and teachers, teachers and students, and teachers, students and the learning environment. In order to students can construct their own knowledge, teachers should provide learning activities that lead students to discover concepts, principles, facts, and mathematical procedures were he learned through exploration and discovery.
3. **Applying**
In the process of experience, students have acquired knowledge of facts, concepts, principles, and mathematical procedures. In the process of applying, facts, principles, concepts, and mathematical procedures used by the students to solve a problem.
4. **Cooperating (working together)**
In the process of cooperating students work together in the form of discussion and exchange of opinions in an effort to find a concept or solve problems. To make it easier to do the same work, the teacher divides the number of students into small groups.
5. **Transferring**
In the process of tranferring, students use the knowledge he has gained in the new context. This means that teachers can give problems challenge and students apply the knowledge that he had to solve new problems.

The steps in the learning of mathematics with a contextual approach is also presented by the Center for Occupational Research and Development (CORD) (1999: 22) that contextual learning focused on the REACT (Relating: learning in the context of life experience; Experiencing: learning through exploration and discovery; Applying: learning when knowledge is introduced in the context of its use in solving real problems; Cooperating: learning through the context of the division of tasks, questions and answers, and communicate with other learners; Transferring: learn to using knowledge in a new context or situation).

Based on the opinion above, the steps of mathematics learning with contextual approach consists of Relating, Experiencing, Applying, Cooperating (working together), and Transferring. To easier for implementing contextual approach in the learning process, the steps can be translated into a number of activities that should be carried out in the learning process, including:

1. **Relating**, in this process the teacher should provide examples of the usefulness and relevance of mathematics in everyday life through the events that had to do with the learning materials. This activity can be done in apperception and motivational activities.
2. **Experiencing**, in this process the student is required to perform learning activities that aim to discover mathematical concepts being studied. While the duty of teachers to guide and

direct students to perform this process so that the process of finding a mathematical concepts into a series of clear and focused activities.

3. Applying, in this process students use concepts that students found to resolve the problem.
4. Cooperating in this process, students are required to perform activities of working groups in small groups. In this small group is expected that students who can tell or teach students who have not been able to follow the lesson, students avoid embarrassment and feel free to teachers, train students to express opinions, and values the opinions of other students.
5. Transferring, in this process students use the knowledge he has gained in the new context. This means that teachers can give problems challenge students to apply the knowledge that he had to solve new problems.

To integrate the cultural values in the learning material, first need to know about the cultural understanding. Koentjaraningrat (2009: 146) argues that culture is a development of cultivation compound word, which means "power and mind". While culture is derived from the Sanskrit, word buddhayah which is the plural of buddhi which means mind or intellect. Another opinion expressed by Betancourt, et al (Woolfolk, 2009: 241) states that culture is the knowledge, skills, rules, traditions, beliefs, and values that directing behavior in a certain group of people as well as works of art and artifacts that are generated and forwarded to the the next generation. In line with Ormrod (2003: 118) states that "When we use the term culture, we are referring to the behaviors and beliefs systems that characterize a social group". This means that culture is the result of human cultivation can be knowledge, skills, rules, tradition, beliefs, behavior, and the artwork produced and forwarded a social group to the next generation.

On the other hand Triandis (Samovar, et al, 2010: 27) states that culture is a subjective and objective elements that made human increase the chances for survival and result in satisfaction of the actors in the ecological niche, and thus spread among those who can communicate with each other, because they have a common language and they live in the same time and place. Based on the opinion above, it can be concluded that the culture is the result of human cultivation of knowledge, skills, rules, traditions, beliefs and works of art produced and passed to the next generation. Culture is necessary generated and forwarded as a tool to communicate one generation to the other, so that people know the human cultivation of each generation.

To integrate cultural values in the learning materials need to be assessed on a form element and culture. Samovar et al, (2010: 29) argues that there are five elements, namely the history of culture, religion, values, social organization, and language. Similarly Deal (1999: 15-68), which suggests that there is some form of culture are: 1) vision and values; 2) ritual and ceremony in which there is a ritual, ceremony, and traditions; 3) history and stories; 4) architecture and artifacts. This means that there are four cultural manifestation that the views and values, religious ceremonies and memorial, history and stories, as well as architecture and objects.

Based on the opinion above, it is known that there is some form of culture in which can be ideas, visions, ideas, values, norms, rules, and so on and culture that is concrete in which may be physical objects, activities (rituals, traditions and ceremonies), the act of human work (history and stories), and culture in the form of a social system (human activities that interact, connect, and get along with each other from time to time according to certain patterns and rules). According to Indonesian dictionary local word meaning place, the local area. Therefore, it can be seen that the local culture is the result of creativity, taste, and human initiative in the form of ideas, activities, and physical objects of a society in a particular region. Culture is necessary generated and forwarded as a tool to communicate one generation to the other, so that people know the result of human cultivation of each generation.

In this studies used some form of local culture in the form of traditional games, traditional arts, religious ceremonies and can be seen as an activity, and historical heritage objects are viewed as artifacts. Based on the study of mathematics learning steps with contextual approach above, the following will be described in more specifically on mathematics learning with contextual approach that combine local cultural value. This is done so that the teacher can easily apply the contextual approach that uses local cultural values in the classroom. The steps of

mathematics learning with contextual approach that applies the local cultural values are as follows:

1. Relating, in this process the teacher should provide examples of the usefulness of mathematics in everyday life . This can be done in apperception and motivational activities. In this activity, the teacher apperception shows the appearance of an image or video that contains various motif that has a geometric shape of a circle, traditional games, legends, traditional arts and ceremonies were described also in students worksheet. Some of the display aims to help students to relate this knowledge to the relevance of mathematics in daily life of students. Here, Batik Kwung is one example of a local cultural association in the form circle motif kawung circle.

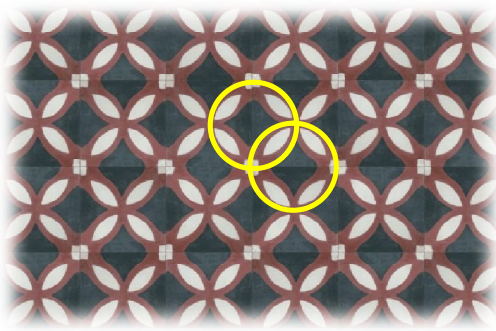


Figure1. Batik Kawung Picis

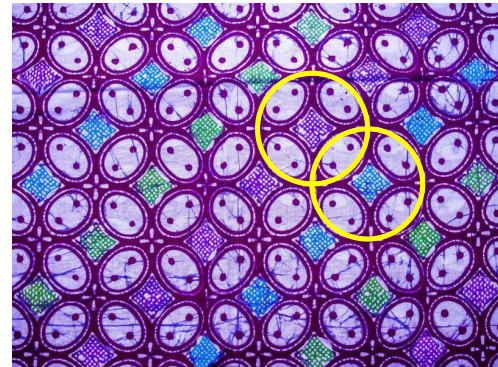


Figure 2. Batik Kawung Bribil

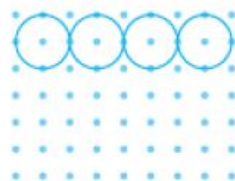
Figure 1 and Figure 2 are picture of Batik Kawung. Batik Kawung patterned dots Kawung similar fruit (coconut similar or sometimes also considered as fruit and fro) geometrically arranged neatly. The relationship between fruit Kawung with one another to form a circle. Philosophical meaning in Kawung batik is as a symbol of courage and justice.

Kawung motif consists of Kawung Picis and Kawung Bribil. Kawung Picis is kawung motif composed by a small circle. While Kawung Bribil is kawung motif composed by larger form than kawung picis.

Before you learn the elements of a circle what are contained in kawung, can you painting batik painting kawung? Yes, to painting batik kawung, you can perform the following steps .

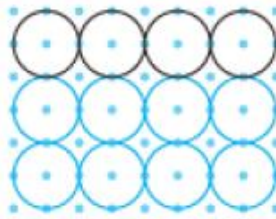
2. Experiencing, in this process student is required to perform learning activities that aim to discover mathematical concepts with the help of worksheets. The worksheet contains steps that help students to discover mathematical concepts. In addition, there are problems that must be solved students after students find math concepts. In this process, use the model to demonstrate what will be discussed. The model in the learning process can be carried out by teachers and students. Model tasked with providing examples of activities that will be carried out in order to discover mathematical concepts. Moreover, in the process of worksheets, teacher in charge of guiding and directing, so that the process of finding a mathematical concepts into a series of clear and focused activities.

- a. Draw four circles in a row as below. All circles are same size.



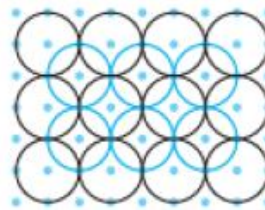
Step 1

- b. Draw three rows of circles, each of rows containing 4 circles that are same size.



Step 2

- c. Draw 2 rows of circle, each of row containing 3 circles with dot between circle in first and second rows, and second and third rows.



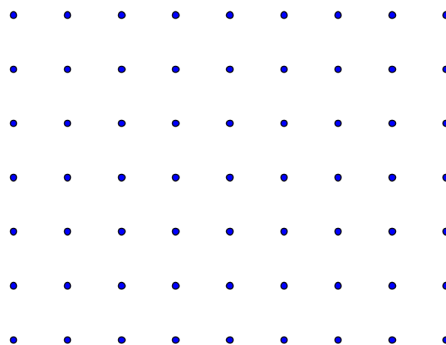
Step 3

- d. Gives colour with your colour pencil as below.



Step 4

- e. Do the first to fourth steps in paper dots below.



3. Applying, in this process students use the concept of which he found to resolve significant issues related to the local culture. This problem has been written in worksheet.
4. Cooperating in this process, students are required to perform activities of working groups in small groups. In this small group is expected that students who can tell or teach students who have not been able to follow the lesson, students avoid embarrassment and feel free to teachers, train students to express opinions, and values the opinions of other students
5. Transferring, in this process students use the knowledge he has gained in the new context. This means that teachers can give problems challenge students to apply the knowledge that he had to solve new problems. Moreover, in this process students are given the opportunity to present the results of the discussion in finding a mathematical concept or in finding a solution of the given problem.

CONCLUSION AND SUGGESTION

Based on the discussion of mathematics learning with contextual approach that uses the values of the local culture, can be summed up some of the following:

1. The local culture is used in mathematics learning with contextual approach is a wide variety of batik motifs that have geometric shapes such as circles, traditional games, legends, traditional arts and ceremonies. Learning mathematics with contextual approach that combines local cultural values are as follows: (1) Relating ie connecting local cultural events associated with the material to be learned through video or image. Cultural events used are various kinds of batik motifs that have geometric shapes such as circles, traditional games, legends, traditional arts and ceremonies. (2) Experiencing which aided student learning activities with worksheets, teachers act as a model to demonstrate the material being studied. (3) Applying that use mathematical concepts to solve meaningful problems associated with the local culture. (4) Cooperating, students work together to solve problems and discover mathematical concepts, and (5) Transferring, students use the knowledge gained in the new context.
2. Teachers should pay attention to the topic of culture that can be integrated into of mathematics learning. In addition, teachers can also choose any cultural event that is suitable to be integrated in the learning of mathematics in order to create meaningful learning.

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