NEEDS ANALYSIS OF MATHEMATICS MATERIALS IN ELEMENTARY HIGH SCHOOL WITH ETHNOMATEMATICS APPROACH IN THE CITY OF YOGYAKARTA

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Abstract

This study aims to: 1) describe the level of need of ethnomatematic teaching materials in Yogyakarta City at the elementary level, 2) to formulate concepts and issues related to ethnomatematics, especially local culture in Yogyakarta and its surroundings. Data were collected by questionnaire through purposive sampling technique and interview then analyzed descriptively. The research findings show that: 1) in general, teachers desperately need mathematics teaching materials for elementary school students, specifically with learning approaches especially ethnomatematics. 2) Ethnomatically related issues to be covered in teaching materials include traditional games, local culture, museums or historical sites, as well as historical events related to mathematics.

Keywords: Needs analysis, Mathematics materials, Ethnomatematic approach, Yogyakarta.

INTRODUCTION

At this time, development of the various countries can be said to have started to progress. This situation began to appear from the progress of science, technology, social, economic, even giving a growing cultural influence. This is one of the effects of globalization. The result of the influence of globalization much impact caused both positive as well as negative impact caused. One of the positive impact of the influence of globalization, namely the increasingly sophisticated technology, advances in science are wider and ease in accessing all lines of life. However, the negative side of the influence of globalization, many Western cultures that goes in our country without a screening process. Due to the cultural influences, a lot of the younger generation that prefer Western culture of its traditional culture. That's because the mindset of those who consider if Western culture that is more modern and more popular, so their awareness in preserving traditional cultures. It all led to the existence of traditional culture in our country started to concern. In the past, traditional culture in our country countless because so many exciting tours, ranging from traditional dances, traditional language, traditional musical instruments, traditional games and much more. But now the traditional culture in the country has already started to eroded. Rarely now we find there are going to want to pay attention to the traditional culture of his country, it's all because of assumptions about their traditional culture is wrong. So they are embarrassed to admit if the traditional culture is their culture. This is supported by the analysis that was done kemendikbud (iii: 2016) that has the onset of a crisis of national identity; decreased understanding of the sublime values of Pancasila; the disappearance a sense of "bhinneka tunggal ika"; local languages are extinct is because one of them like there is no successor language speakers of the area; young life style on the boat now tend to be far from the roots of Eastern cultures even replaced with Western culture; Home and custom clothing as well as traditional tools have started to become extinct from Indonesia society.

One of preserving a culture is through education. Especially in the education of mathematics education to bridge between mathematical culture is ethnomatematics. Etnomatematics is a math-based learning approach to local culture so that etnomatematics can deliver payloads and bridging between the mathematics in the everyday world, based on the local culture with the mathematical school.

Learning math is inseparable from the school curriculum adopted by the national level. Based on PP No. 32 year 2013 i.e. Curriculum 2013 for learning is effective, then the learning process in educational units organized in interactive, inspiring, fun, challenging, motivating learners to participate actively, as well as providing enough room for initiative, creativity, independence in accordance with the talents, interests, and physical and psychological development of learners. Curriculum 2013 revision 2017 this not only demands the liveliness of teachers in selecting and creating environmental corresponds to student activities/student's local culture but also demands the cooperation of all the components of the school. Therefore, the readiness of the human resources and means as well as the infrastructure that is needed in the implementation of learning math

became a concern and shared responsibility of all components of the school to be able to establish the competence of graduates expected. The existence of good learning devices in the form of books, worksheets, indispensable learning materials to help teachers and students learning mathematics am dal. While the mathematical textbook that circulated during this time though it is labeled according to the curriculum (latest) on its cover, but its content is not changing significantly. This means the development of learning materials that comply with the latest curriculum development with local cultural based approach becomes important is done to improve the quality of learning materials and the successful implementation of the curriculum.

Based on the observation that in some areas the researchers conducted in Yogyakarta found that textbook used in elementary schools is very limited especially in elementary schools with low quality. In addition, teachers haven't been able to adjust the existing curriculum, learning and socialization device limitations against the latest curriculum is extremely limited. This limitation effect conferring to the ability of teachers in developing a learning device, moreover the device learning mathematics-based local culture/ethnomathematics.

Indonesia could also be called by the country's culture because in Indonesia is rich in the variety of cultures that are diverse, every region in Indonesia must have its own culture/local wisdom. One of the local wisdom can be reflected in physical culture, such as the existence of sites/historic building, historic documents, etc. The existence of sites/ historic building in Indonesia is very diverse and scattered in all corners. According to kemendikbud (2016:56) the symbolism of physical culture is seen in the graphic below

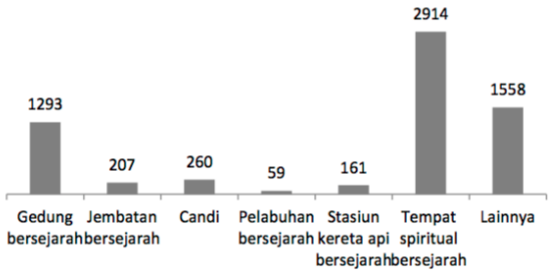

Figure 1. The number of sites/buildings according to its kind in Indonesia

Yogyakarta is a famous city with the city's education and culture city. The legislation Privileges Yogyakarta special region no. 13 year 2012 which has owned the Yogyakarta, stabilizing the position and an important role in keeping the Yogyakarta, maintain and develop its cultural wealth, both at the level of local, regional and nationwide. Yogyakarta has become a cultural development direction especially of Javanese culture, and become a model for development of other cultures that existed in Indonesia. Cultural aspects are also increasingly thick coloring throughout the life of the Community aspect of Yogyakarta.

Table 1. Physical Culture in Yogyakarta & Central Java

No.	Type of Physical Culture	Yogyakarta	Central Java
1	Historic building	29	80
2	Historic bridge	7	28
3	Temple	10	38
4	Historic harbor	0	4
5	Historic railway station	7	35
6	Spiritual historic place	45	285
7	Others	28	74

Source: *Kemendikbud. 2016. Analisis Kearifan ditinjau dari budaya lokal. Pusat Data dan Statistik Pendidikan dan Kebudayaan: Jakarta*

Table 2. Non Physical Culture in Yogyakarta

No	Type of Non Physical Culture	2009
1	Traditional ceremonies	359
2	Ceremony of life cycle tradition Other	34
3	Traditional clothing	15
4	Traditional Salon	349
5	Other	Infinity

Source: *Dispar DIY. 2015. Statistik kepariwisataan 2015. Yogyakarta*

Based on the above data looks that Yogyakarta and its surroundings have a supporter culture of both physical and non-physical that can be integrated with learning materials. The limitations of the existing material in schools that integrate local culture is very low. Therefore, based on the description that has been presented above can be known that the objective in this paper is to describe the level of needs of ethnomatematics learning materials in the city of Yogyakarta in the primary level, in addition to formulating the concept and issues related to the local culture in particular ethnomatematics in Yogyakarta and surrounding areas.

RESEARCH METHOD

This research is quantitative descriptive research was carried out in the city of Yogyakarta. The subject is a primary school teacher in the city of Yogyakarta. Sampling is done with the purposive technique sampling, i.e. by taking subjects who have had experience teaching in the higher and lower classes into the sample. A sample of randomly selected sebancak 43 elementary school teacher. Data collection method using questioner and interviews. Kuestioner is used to uncover needs in the selection of learning materials, learning related issues with ethnomatematics, a selection of the characteristics of the class and characteristics of the students. The interview is used to uncover obstacles in developing learning materials and related materials deep-seated interview-based ethnomatematics.

RESULT AND DISCUSSION

Result

Analysis of the research results 1) describe the level of need of ethnomatematic teaching materials in Yogyakarta City at the elementary level, 2) to formulate concepts and issues related to ethnomatematics, especially local culture in Yogyakarta and its surroundings.

Level Of Need Of Ethnomatematics Teaching Materials In Yogyakarta City At The Elementary Level

On the subjects who have been asked to fill out the questionnaire about the need for teaching materials based on ethnomatematematics is described in the following data:

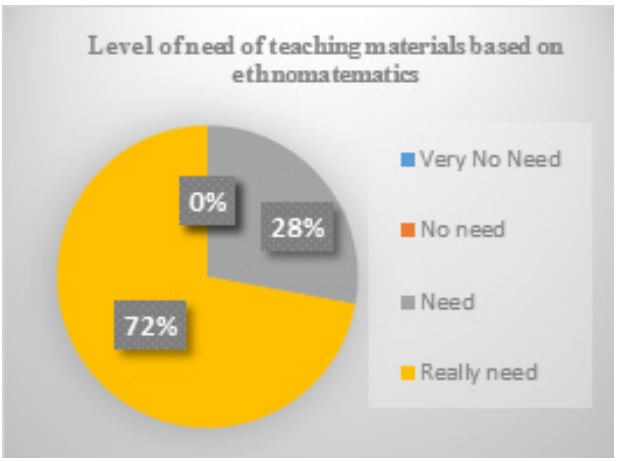

Figure 2. Level of need of teaching materials based on ethnomatematics

Based on Figure 2 it is seen that the level of need of teaching materials based on ethnomatematics 72% or as many as 31 elementary school teachers really need teaching materials based on ethnomatematics, 12 elementary school teachers choose need, and no one chooses no need and very no need.

Furthermore, the identification of the required teaching materials varies considerably from textbooks, modules, worksheets, brochures, handouts, etc.

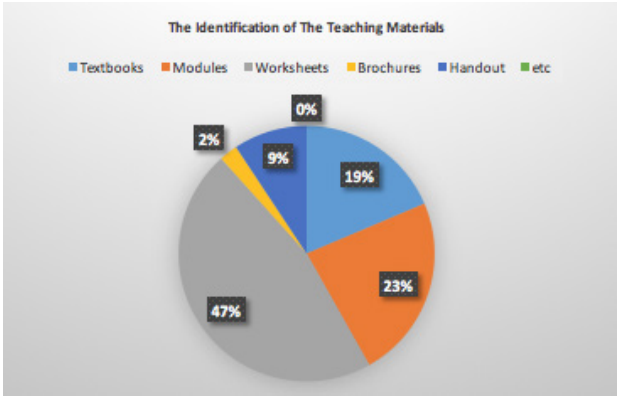

Figure 3. the identification of the teaching materials needed

Based on figure 3 above it can be seen that as many as 23% choose module, 47% choose worksheets, 2% choose brosure, 9% choose handout and 0% choose others.

Furthermore, the indentification of materials that are appropriate to the development of teaching materials desired by elementary school teachers include geometry, numbers, statistics. The following data related to the material needs to be developed in teaching materials based on ethnomatematics.

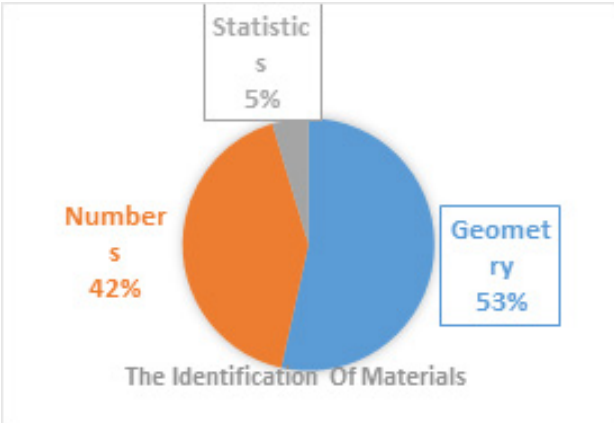

Figure 4. the identification of the materials needed.

Based on figure 4 above it can be seen that as many as 53% choose geometry, 47% choose numbers, 5% choose statistics.

Based on the class data that according to the teacher requires the teaching materials based on ethnomatematics grouped into 3 groups of 1-2, 3-4 grade and grade 5-6. Here are the results of data that have been obtained in the field.

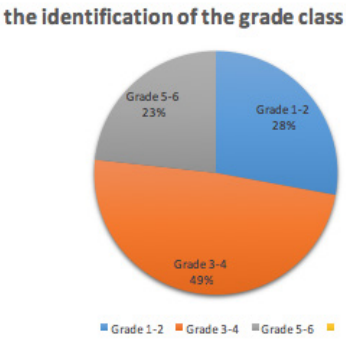

Figure 5. the identification of the grade class needed.

Based on figure 5 above it can be seen that as many as 49% choose grade 3-4, 28% choose grade 1-2, and 23% choose grade 5-6.

Concepts And Issues Related To Ethnomatematics, Especially Local Culture In Yogyakarta And Its Surroundings.

The data presented above shows that culture is divided into 2, namely physical culture and non-physical culture. The author explores the desired needs of the teacher regarding the concepts and characteristics of the material in accordance with the needs of students. The following data types of culture in accordance with the characteristics of students and materials on figure 6.

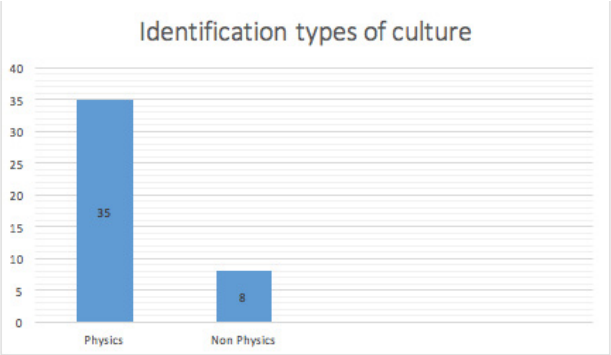

Figure 6. the identification of type of culture.

Based on figure 6 above it can be seen that as many as 35 teacher choose grade physics and 8 person chose non physics.

Physical culture is divided into historic building, historic bridge, temple, historic harbor, historic railway station, spiritual historic place, others. Furthermore, the teacher chooses a physical culture appropriate to the characteristics of students and materials. The identification of physical culture is presented in figure 7.

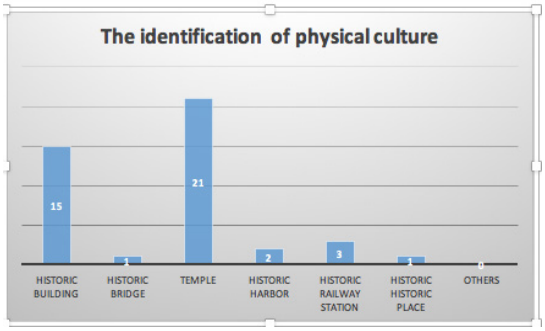

Figure 7. the identification of physical culture.

Based on figure 7 above it can be seen that as many as 15 person historic building, one person choose historic bridge, 21 person choose temple, two person choose historic harbor, three person choose historic railway station, one person choose spiritual historic place, no one choose others.

Non physical culture divide into traditional ceremonies, ceremony of life cycle tradition, traditional clothing traditional salon, other. The identification of non physical culture is presented in figure 8.

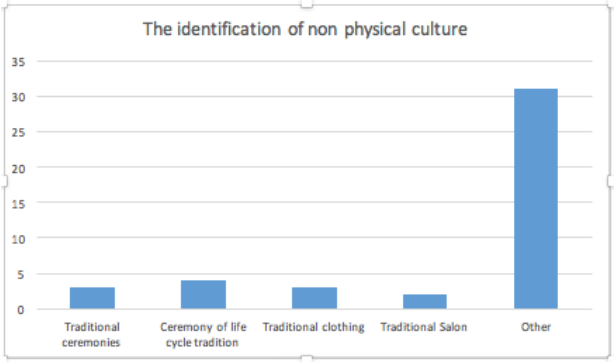

Figure 8. the identification of non physical culture.

Based on figure 8 above it can be seen thas as many as 3 teacher choose traditional ceremonies, 4 teacher choose ceremony of life cycle tradition, 3 teacher choose traditional clothing, 2 teacher choose traditional salon, 31 teacher choose other.

Discussion

From the results of the research can be seen that the teaching materials based on etnomatematika is one of the development needs of the very much needed elementary school students. That is, a student not only learns mathematics from a book that a teacher is distributing but learns from teaching materials that are developed by developing a local culture that exists in the student environment. In addition, Based on the data from the above research it is found that teachers are in desperate need of teaching materials in the form of worksheets by further developing the physical culture. Based on research conducted

by Rochman (2016) shows that the use of student worksheets on teaching and learning activities in the class makes students prefer in a structured learning process and students are also easier to learn when at home. In addition, the existence of worksheets of teachers of Islamic Education teachers easier in delivering the material although it should provide additional material that is not in the textbook of student worksheets. Utilization of student worksheets can improve the effectiveness of learning Islamic Religious Education. Therefore, the teaching materials to be developed are ethnomatematics-based teaching materials in the form of worksheets.

The broad mathematical concepts related to various activities of community life, including grouping activities, arithmetic, measuring, designing buildings or tools, playing, determining location, forming a settlement pattern and so forth. The identification of the material shows that the proposed material is geometry and number material. Pritchard (2012) show that "captured the essence of this aspect of visualization by stating that geometry fosters on students an ability to visualize and mentally manipulate geometric objects". The statement has a meaning that with the visualization aspect of geometry requires students' ability to visualize and manipulate geometry objects. Yulianti (2010:24) show that knowing the concept of numbers is part of the child's cognitive abilities, cognitive is often interpreted by intelligence or thinking. The ability to think is the ability or the ability to use the mind to consider, decide, analyze, criticize to do something well and carefully based on consideration or reference.

Cultural-based mathematics allows students to think abstractly into real according to their environment. In addition, knowledge of the mathematics derived from the socio-cultural environment and embedded hereditary is certainly to be one of the initial capital in learning mathematics so that math can be learned more easily by the community. It's just that the initial knowledge must be assimilated, constructed and developed in the process of learning mathematics so that later will produce the knowledge of mathematics intact, embedded and more meaningful. The identification from class grade at low grade. Through the child's point of view, Micklo (Beaty, 2010: 249) states that children learn to group and structure mathematics in the same way, they learn from the surroundings by manipulating real objects and composing new knowledge after practicing in physical actions and mental activities of children.

The development of mathematics teaching materials with ethnomatetics approach not only supports the preservation of culture also makes the learning of mathematics easy for the students because according to the learning according to the students experience. In addition, the cultivation of cultural values is very important for the formation of character due to technological advances and the impact of globalization faster and easier. Therefore, educators should always develop materials to reveal the culture that ever existed and developed in society without leaving the material that must be taught according to the curriculum learners.

CONCLUSION AND SUGGESTION

It can be concluded that teachers are in need of teaching materials based on ethnomatematics in the form of worksheets with physical culture such as temples and historic buildings. Furthermore, worksheets developed for high and low classes on geometry and number materials.

Based on the conclusions mentioned above, the authors recommend to teachers to use instructional materials based on learning models in each learning carried out in schools or based on existing learning models of student environments or based on local culture. Furthermore, teaching materials based on learning models used by teachers in schools should be prepared by teachers independently so that the application level is more appropriate because the teacher is actually the most understand the condition of the students in school.

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