



CERTIFICATE

No. 047/1C/PPS-UNM/C/ICoESM/VIII/2021



This acknowledges that

ADI LEKSMONO

has participated as

Presenter

in

1st International Conference on Educational Studies in Mathematics (ICoESM 2021)

Theme: "The Advancement of Mathematics Education during and after the Covid-19 Pandemic"
organized by Postgraduate Program, Universitas Negeri Makassar

Makassar, Indonesia
August 10, 2021



Prof. Dr. Ir. H. Husain Syam, M.T.P. IPU, ASEAN, Eng.
The Rector of Universitas Negeri Makassar



Nurwati Djam'an, S.Pd., M.Pd., Ph.D.
The Chairman of ICoESM 2021

Mathematical Literacy of Gintangan Bamboo Weaving in Ethnomathematical Perspective and Ethnomodelling

*Adi Leksmono¹, Mega Teguh Budiarto², Rooselyna Ekawati³

¹Doctoral student of Mathematics Education, Universitas Negeri Surabaya (UNESA)

²Universitas Negeri Surabaya (UNESA)

³Universitas Negeri Surabaya (UNESA)

Corresponding author : adi.20004@mhs.unesa.ac.id

ABSTRACT

Banyuwangi is one of the areas in the cape of the eastern Java Island, which is identical with its traditions and culture. This article describes the ethnomathematical perspective and ethnomodelling to solve contextual problems. This study uses a qualitative approach. The data collection used is observation, interviews, and documentation. The results presented that the mathematical literacy of woven bamboo Gintangan handicrafts can be integrated into mathematics learning, specifically number patterns. These results can be used to integrate the role of mathematics in a sociocultural context involving related ideas and concepts with ethnomathematics.

Keywords: *Mathematical Literacy, Ethnomathematical, Ethnomodelling.*

1. INTRODUCTION

The cultural development among people recently is immensely related to students. The diversity of each student's background brings influence into the school. Hence, the school endeavors must be able to accommodate the developing cultures in the environment of the students.

Some bachelor graduates have developed culturally relevant pedagogical theories that examine teaching and learning processes within a critical paradigm and through explicit relationships between student culture and school subject matter ([1]; [2]; [3]). In this perspective, it is necessary to integrate a cultural-based curriculum within the existing mathematics curriculum. According to [4], the National Council of Teachers of Mathematics Guidelines highlights the importance of establishing links between mathematics and students' personal and cultural lives. In keeping with this approach, [5] assert that "When practical or cultural-based problems are examined in appropriate social contexts, Practical mathematics of social groups are not trivial because they reflect themes that are closely related to everyday life. Student life" (p. 34). According to [5], a culturally relevant mathematics curriculum should focus on the role of mathematics in a sociocultural context involving ideas and concepts related to

ethnomathematics, using an ethnomathematical perspective to solve contextual problems.

The PISA framework in measuring mathematical literacy is distinguished into three aspects: content, context, and cognitive. PISA's content or material aspects consist of quantity, uncertainty and data content, change and relationship, and space and shape. The context aspect consists of personal, societal, occupational, and scientific contexts. While the cognitive aspect consists of six levels starting from the lowest level to the highest level of knowledge [6].

Gintangan is one of the villages in Banyuwangi Regency, which is famous for its woven bamboo crafts. This craft business processes natural resources owned by the countryside, namely bamboo plants. Currently, bamboo plants have grown and spread throughout Indonesia. This situation indicates that the raw materials for woven bamboo handicrafts are available around the business location [7].

The fact shows that Indonesian students have difficulty in the process of formulating problems in everyday life into mathematical models ([8]; [9]).

According to Geertz [10], "Local wisdom is part of the culture. Local wisdom is a traditional cultural element that is deeply rooted in human life and community related to human resources, source of culture, economic, security, and laws. Local wisdom can be viewed as a tradition related to farming activity, livestock, build a house, etc."

Local wisdom is part of the culture. In addition, local wisdom is deeply rooted in human life related to human resources, culture, economy, security, to customs. Local wisdom can also be seen from agricultural activities, animal husbandry, and mutual cooperation in making houses. This is to preserve the culture of the younger generation.

Local wisdom is always related to human life and the environment. Therefore, by applying the values of local wisdom, the balance of nature will continue to be maintained in the future. In addition, local wisdom has various functions. The function of the local wisdom of the Using Banyuwangi community includes (1) conservation and preservation of natural resources; (2) human resource development; (3) development of culture and science; (4) advice, beliefs, literature, and taboos; (5) social meaning, for example, communal/relative integration ceremony; (6) means ethics and morals; (7) means politics. Local wisdom can be integrated with ethnomathematics learning as one of the lessons in junior high school.

2. RESEARCH METHOD

This study uses a qualitative approach. The research was conducted in Gintangan Village, Blimbingsari District, Banyuwangi Regency, East Java Province. The subject of this research is Mr. Amanto. The son of Mr. Madrawuh, the founder of the "Real Work" bamboo woven craft studio, Gintangan Village.

Collecting data using observation, interviews, and documentation. Data analysis was carried out using the flow method from [11], which consisted of data reduction, data presentation, and concluding.

3. RESULTS AND DISCUSSION

The occurrence of Gintangan Village began around the 1800s. At that time, there was a husband and wife named Madram called the Sulung Agung, who was the aide of Raden Sidopekso and his wife, Raden Ajeng Raminah. Both tripe pedestals, and

because the Gintangan area did not have a spring, they took water from the upper Kaligung river every afternoon for their daily needs. The husband and wife used a container made of bamboo pieces called "Gontang." Because of that habit, the residents of neighbouring villages called them from the name Gontang refined into Gintangan. This name later became the name of the region.

The demographics of the Gintangan Village area have 7560 inhabitants, with 49.1% male and 50.9% female. With the details of the age of the residents as follows: 11.1% aged < 10 years, 14.9% 11-20 years old, 14.5% 21-30 years old, 31-40 years old 14.9%, 41-50 years old as many as 16.5%, 51-60 years as many as 13.7%, 61-70 years as much as 7.4%, and >70 years as much as 6.9%.

The development of woven bamboo crafts cannot be separated from a creative figure named Mbah Madrawuh. Mr. Amanto, the son of Mbah Madrawuh, said that his father's expertise was obtained from bamboo craftsmen in the Giri sub-district. Many motifs are owned by Gintangan Village, including Truntum Bintang, Motopuru, Pipil, Pipil combination, Liris, Liris Italic, Crow's Claw, Sun, and so on.

Bamboo is a tropic plant. It has many benefits, such as one of the crafts in Gintangan Village. Uniquely, the bamboo plants are not available or rarely found in this village, especially the apus bamboo, which is frequently used as the main ingredient for handicrafts. The raw materials are obtained from Sempu and Tile Villages.

Initially, bamboo crafts were made in household utensils such as baskets and steamers to cook rice. Since the 1980s, woven bamboo in Gintangan Village has developed into more innovational forms such as serving hoods, skullcaps, and lampshades. Bamboo woven handicraft products emerge both in the local market in Indonesia and overseas, such as in Malaysia, Thailand, and other countries in Europe. Modern weave uses a variety of attractive colors in the final product. Examples of modern weaving are flower vases, tissue boxes, decorative lamps, caps, and various knick-knacks made of bamboo. Traditional weaving has the characteristic of using the original color of the bamboo. Then, Traditional woven products include steamers, tenong, baskets, winnows.

In the process of making woven bamboo in summer, bamboo slats are dry enough within a day. However, if it is a rainy season, the bamboo slats are completely dry and ready to woven in several days. Apus bamboo is wields as it has fine fibres and better flexibility than other types of bamboo, so it is moulded effortlessly.

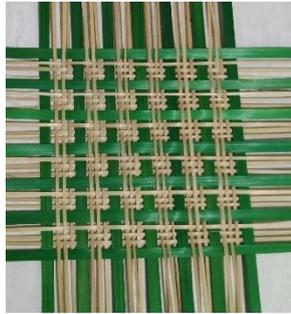


Figure 1. Combination of Woven Bamboo

The apus bamboo used has a length of ± 60 cm and a width of ± 0.2 cm. This study uses a combination woven model, which is 1, 3, 1, 3, 1, ... by using the formula for the number pattern, specifically

$$U_n = \frac{2n^3 - 18n^2 + 46n - 27}{3}$$

4. CONCLUSION

With the ethnomathematics of woven bamboo, it is expected that students will be able to apply mathematics to the existing cultural context. Therefore, mathematics will be more easily attached to students.

REFERENCES

[1] D'Ambrosio, U. 1990. *Etnomatemática* [Ethnomathematics]. São Paulo, SP, Brazil: Editora Ática.

[2] Gay, G. 2000. *Culturally responsive teaching: Theory, research, and practice*. New York, NY: Teachers College Press.

[3] Rosa, M., & Orey, D. C. 2003. Vinho e queijo: Etnomatemática e Modelagem! [Wine and cheese: Ethnomathematics and modelling!]. *BOLEMA*, 16(20), 1-16.

[4] Torres-Velasquez, D., & Lobo, G. 2004. Culturally responsive mathematics teaching and English language learners. *Teaching Children Mathematics*, 11, 249-255.

[5] Rosa, M., & Orey, D. C. 2008. Ethnomathematics and cultural representations: Teaching in highly diverse contexts. *Acta Scientiae - ULBRA*, 10, 27-46.

[6] OECD. 2016. *PISA 2015 Assessment and Analytical Framework: Science, Reading, Mathematics and Financial Literacy*. Paris: PISA-OECD Publishing.

[7] Gerbono, Anton. dan Djarijah Siregar, Abbas, 2004. *Aneka Anyaman Bambu*. Penerbit Kanisius. Yogyakarta.

[8] Edo, S. I., Hartono, Y., & Putri, R. I. 2013. "Investigating Secondary School Student's Difficulties in Modelling Problem PISA-Model Level 5 and 6". *Journal on Mathematics Education (IndoMS-JME)*. Vol. 4 (1): hal 41-58.

[9] Jupri, A., dkk. 2014. "Difficulties in Initial Algebra Learning in Indonesia." *Mathematics Education Research Journal*: pp 1-28

[10] Geertz, C. 1973. *The interpretation of cultures*. New York: Basic Books Inc. Publisher.

[11] Miles, B. M., & Huberman, A. M. 1994. *Qualitative Data Analysis (2nd Editio)*. California: Sage Publications.