

CAN MATHEMATICS INTEGRATED WITH MALAY CULTURE

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Abstract. This research aims to explore whether mathematics can integrate with the Malay Culture of Indonesia, Riau Province Cultural. The participants of this research are teachers and lecturers. Teachers and lecturers are chosen because they are the participants who always participate in mathematics teaching and explore how this process must be fixed to get the best learning results. The collecting data technique are interview guide is designed to get information from teachers and lecturers. Analysis data techniques used in this research were from Cresswell (2014). The research results show the integration of Malay Cultural and Mathematics Subjects in the teaching and learning process can be conducted maximally. Many historical subjects of Malay culture can be used as media or material in mathematics teaching. Teachers can implement this integration every day so that the students will be able to understand their culture. A kind of cultural can be integrated with Mathematics that is; Malay Games, Was Instrumental of Siak or Pelalawan District, Traditional Food, Traditional Costume or Married costume, and Traditional Game.

Keywords: *Mathematics Integration, Malay Culture, Ethnomathematics*

1. INTRODUCTION

Maintaining a culture is an important thing that must be done by every element of a country especially the education agency of a country. This is can be done Through the specific way that implemented every day in the classroom (1,2). Through this way, every student can learn about this culture that before they did not know. The feeling love of for their culture will increase if the cultural transformation can be conducted through the teaching and learning process in the classroom (3). Students can join and enjoy the learning process so that this process will instill the student's love of the Malay culture Specially Riau Culture (4). Teachers and every education element can easily give material about the Malay culture of Riau through the Classroom process.

The importance of maintaining the culture of Malay of Riau Province is something that is a priority because many young people have forgotten their culture and are replaced with games online, social media, and many interaction effects of advanced technology (5). Malay Cultural are the Malay people's habits or activity that become the Malay Identity (6). Malay culture has many important values and meanings in the context of Malaysia, Indonesia, Singapore, Brunei, and other regions in Southeast Asia which the Malay ethnic group inhabits (7,8). The importance of Malay culture is because of Malay culture's National Identity. Malay culture is a critical element in shaping the national identity of countries such as Malaysia and Indonesia (9). This culture reflects the rich history, traditions, and heritage of the Malay ethnic group, and is the basis for unity and unity within the framework of the state.

Malay culture encompasses a variety of elements, including language, art, music, dance, traditional clothing, food, and religion. This created rich cultural diversity in the region and allowed various ethnic and religious groups to coexist in harmony. Malay culture is a historical heritage. Malay culture has developed over the centuries, creating a rich and varied historical heritage. This includes traditional arts such as shadow puppetry, traditional dances such as the zapin dance, and government history such as the Melaka Sultanate.

Thus, Malay culture has a very important role in shaping identity, cultural diversity, historical heritage and development in the Southeast Asian region. It also promotes positive values such as tolerance and integration among various groups in society, which provide a strong foundation for sustainability and social harmony. Malay culture has many important values and meanings in the context of Malaysia, Indonesia, Singapore, Brunei and other regions in Southeast Asia which are inhabited by the Malay ethnic group. The importance of Malay culture is because Malay culture is a National Identity. Malay culture is a key element in shaping the national identity of countries such as Malaysia and Indonesia. This culture reflects the rich history, traditions and heritage of the Malay ethnic group, and is the basis for unity and unity within the framework of the state.

The importance of Malay culture is because Malay culture is also part of historical heritage. Malay culture has developed over the centuries, creating a rich and varied historical heritage. This includes traditional arts such as shadow puppetry, traditional dances such as the Zapin dance, and government history such as the Melaka Sultanate. Malay culture is also part of economic development. Malay culture also plays a role in the economic sector, such as creative industries, handicrafts and cultural tourism. This creates job opportunities and economic growth in these areas. Thus, Malay culture has a very important role in shaping identity, cultural diversity, historical heritage and development in the Southeast Asian region. It also promotes positive values such as tolerance and integration among various groups in society, which provide a strong foundation for sustainability and social harmony.

The integration of culture with education has many benefits and importance in developing a diverse and multicultural society. Here are some reasons why integrating culture with education is so important. Cultural Understanding: The integration of culture in the educational curriculum helps students understand and appreciate the various cultures that exist in the world. This helps them become citizens who are more aware of cultural differences and contributes to tolerance and respect for others.

Based above explanation, the research about integration between cultural and education was very important to do so that the stakeholders can design the new concept to improve or fix the students cultural understanding.

2. RESEARCH METHOD

This research is qualitative research with study case approach especially in Riau Province. This research aimed to explore integration mathematics material and Malay Culture that can be conducted to maintaining the Malay culture by young generation at

elementary schools, junior high schools, senior high schools. The research participant were teachers and lecturers at Riau Province. The Data collection techniques was interview. The data collection technique was the interview guidance. Data were analyzed using the approach proposed by Creswell (2014): preparing and defining data, reading the data as a whole, encoding data, defining themes and creating descriptions, linking themes, and interpreting themes.

3. RESULTS AND DISCUSSION

3.1 Results

Based on the Focus Group Discussion (FGD) with mathematics teachers and lecturers, its were get results that many things or object of Malay Culture can be integrated with mathematics learning that is Malay Games, War Instrumental of Siak or Pelalawan District, Traditional Food, Traditional costume, and married costume. Through the integration process, the obligation of government in maintaining can be conducted maximally. This process will increase Identity and Personality. Culturally integrating education gives students the opportunity to identify themselves in their own cultural context. This helps them understand who they are and develop a sense of identity and cultural pride.

Contextual Learning: Using cultural examples in teaching can make lessons more relevant and contextual for students. It helps students connect theories and concepts with real experiences in everyday life. Improve Intercultural Skills: Cultural integration can help students develop intercultural skills that are important in the era of globalization. They can learn how to communicate and collaborate with people from various cultural backgrounds. Combating Stereotypes and Prejudice: Education that incorporates cultures can help overcome stereotypes and prejudice that often arise from a lack of understanding of other cultures. This helps reduce conflict and increase cooperation in society.

Integration of education with culture can promote diversity in teaching. Cultural integration can encourage the use of diverse resources and teaching methods in the classroom, creating a more interesting and varied learning experience. Preserving Cultural Heritage: Education can play a role in preserving valuable cultural heritage. It includes language, traditions, art, music, and cultural history. By integrating these elements in the curriculum, we can help prevent the loss of cultural heritage. Improved Multicultural Skills: In an increasingly connected world, multicultural skills are becoming increasingly important. Cultural integration in education helps students develop a better understanding of how to interact with individuals and communities from different cultures.

The integration of education with culture can increase peace and social harmony. When students understand each other's culture, this can help in promoting peace and social harmony. They can learn to resolve conflicts and interact in ways that respect other people's cultures and values. The integration of culture with education plays a key role in creating an inclusive, tolerant and multicultural society. This helps create a strong foundation for peace, harmony and sustainable social development.

In mathematics education, educational integration can be done through food. Malay foods, such as nasi lemak, rendang, satay, and many other dishes, have become an important part of the world's culinary culture. These dishes reflect the diversity of flavors and natural ingredients of the region. Apart from that, it can also be done with arts and crafts, fine arts, music and traditional Malay dance which has its own uniqueness which can be included in mathematics material. Examples are batik art, wood carving, gamelan, dancing, and many more. This art plays an important role in maintaining Malay artistic and cultural heritage. Integration can also be done through playing Malay games which were very popular at that time, such as Guli, Panjang Galah, Congkak, Statak, Patok Lele and other games. Integration between mathematics and Malay Culture will be easily conducted by arranging the Syllabus, Learning Plan, student worksheet, and digital media.

3.2. Discussion

Integration between education and culture is important think can be conducted by every element of education. Through integration, culture maintaining process will easily can be conducted by government even traditional institutions of a District. Culture and education will run maximally when the process integration can be done with the best procedure (10–12). Some object of Malay culture in Riau Province have integrated with mathematics material and given a significant result in maintaining Malay culture (13–15). Integration between education and cultural can be managed by education, cultural, agency, and cultural institution of Malay (Lembaga Adat Melayu).

Integrating mathematics learning with culture is an innovative approach that incorporates elements of local culture into the process of learning mathematics (16–18). This strategy aims to make learning more contextual, meaningful, and encourage a sense of belonging to cultural heritage (19–21). In education, this approach is known as ethnomathematics, which is the study of mathematics that grows and develops in the context of community culture. Ethnomathematics not only enriches learning, but also plays a role in preserving local wisdom that is being eroded by globalization (22–24). Best practice in this integration begins with a deep understanding of local culture. Teachers need to explore the richness of local culture such as the shape of traditional buildings, traditional games, traditional measuring and calculating systems, patterns on woven or batik cloth, and local economic activities (25,26). This understanding becomes the basis for identifying relevant mathematics materials to be integrated, for example, geometry concepts associated with symmetry in batik motifs or traditional dance floor patterns.

The next step is to select mathematical concepts that are appropriate to the cultural context that has been understood. For example, in teaching the concept of flat buildings, teachers can use the shape of the roof of a typical traditional house or the patterns in wickerwork. For measurement topics, teachers can utilize traditional measurement methods used by local communities, such as measuring the area of rice fields using traditional units. These contexts make math feel more real and applicable to students (27–30). The use of contextual learning resources is very important in this integration. Cultural artifacts such as

musical instruments, agricultural equipment or traditional household tools can be interesting learning media. In addition, folklore and local legends can also be an effective introduction to build understanding of mathematical concepts in a narrative way. For example, stories about the spice trade can be used to teach the concept of comparison or unit conversion.

The involvement of local communities and cultural figures is an important aspect in strengthening the authenticity and depth of cultural integration in learning. Involving parents, elders, or local artists as resource persons or assistants in learning activities can provide added value. Students not only learn math, but also absorb cultural values such as mutual cooperation, hard work, and social responsibility (31–33). In practice, teachers need to develop math problems and activities based on the cultural context. For example, in the topic of linear equations of two variables, teachers can design problems related to the price and amount of purchases of regional specialties. For statistics learning, the data used can come from the results of a survey of community habits in traditional celebrations. These activities increase student engagement and hone their critical thinking and problem-solving skills.

The development of teaching materials such as Learner Worksheets (LKPD) or culture-based learning modules is an important part of this process. These teaching materials should explicitly include the cultural context and be integrated with the mathematical concepts being taught. The design of the LKPD should be interactive and encourage students to collaborate, explore and reflect on their learning. The choice of learning model also needs to be adapted to this contextual approach. Learning models such as Contextual Teaching and Learning (CTL), Problem-Based Learning (PBL), and Project-Based Learning (PjBL) strongly support cultural integration. These models allow students to explore their own knowledge based on real experiences linked to local culture. In addition, project-based learning allows students to create real products that reflect the application of mathematics in their daily lives.

After the implementation of learning, teachers need to reflect and evaluate. Evaluation includes not only cognitive, but also affective and psychomotor aspects. Teachers can use instruments such as questionnaires, interviews, or observations to determine the extent to which cultural integration has an impact on students' motivation, concept understanding, and attitudes towards mathematics and local culture. To support the sustainability and development of teacher competencies, regular training is needed. Teachers need to be trained on how to design, implement and evaluate culture-based learning. This training is also a place to share good practices among teachers so that there is an exchange of ideas and inspiration. Finally, documentation and publication of good practices is essential. Teachers or educational institutions should document every learning innovation that has been carried out, whether in the form of articles, learning videos or activity reports. This publication not only demonstrates accountability, but can also serve as a reference for other teachers who want to develop similar approaches.

4. CONCLUSION

Many historical subjects of Malay culture can be used as media or material in mathematics teaching. Teachers can implement this integration every day so that the students will be able to understand their culture. A kind of cultural can be integrated with Mathematics that is; Malay Games, Was Instrumental of Siak or Pelalawan District, Traditional Food, Traditional Costume or Married costume, and Traditional Game.

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