IMPLEMENTATION OF CULTURE-BASED LEARNING MODELS TO IMPROVE STUDENTS' MATHEMATICAL COMMUNICATION

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ABSTRACT

The culture-based learning model is a learning innovation and a solution for improving students' mathematical communication skills. The culture-based learning model is able to motivate students in aspects of their complete cognitive development. This research aims to determine the implementation of a culture-based learning model to improve students' mathematical communication skills. The method used in this research uses literature study. Literature was reviewed based on method, year of publication, and main findings. The results of this research literature study show that the implementation of a culture-based learning model has a positive impact. The implementation of a culture-based learning model is able to stimulate students' curiosity about learning, causing students to be active in providing responses, so that this can trigger an increase in students' mathematical communication skills.

Keywords: Learning models, Culture, Mathematical Communication

1. INTRODUCTION

Education functions to empower human potential to inherit, shape and build future culture and civilization. Education also functions to preserve positive cultural values and to create changes towards a more innovative life. The aim of National Education according to the 2003 National Education System Law Article 1 is to form the potential of students to have intelligence, personality and noble morals. Vygotsky (Santrock, 2011)believes that education plays an important role in helping children learn cultural tools. The education system has an important role in the development of education and culture. As Vigotsky (Santrock, 2011) said, the contribution of culture, social interaction and history in children's mental/behavioral development is very influential.

Learning models based on culture and social interaction refer to aspects of socio-historical and cultural development and will have an impact on children's perceptions, memories and ways of thinking. This is because culture teaches children about cultural values, so that they understand their cultural environment. The culture-based learning model is a strategy for creating a learning environment and designing learning experiences that integrate culture as part of the learning process (Sutarno, 2012). The culture-based learning model is based on the recognition of culture as a fundamental part of education and the development of knowledge. Furthermore (Sutarno, 2012) explains that culture-based learning is very useful for interpreting learning processes and outcomes for students to gain contextual learning experiences and apperception materials to understand scientific concepts in their local culture.

In 2022 after the DPR passed the Law on the Establishment of Southwest Papua, the number of Indonesian Provinces will become 38 (Wikipedia, 2022). Each province has a diversity of cultures, races, ethnicities, religions and groups, all of which constitute invaluable wealth that the Indonesian nation has as a multicultural country. There are many cultural values that can be packaged in learning, both from customs, art, typical food, crafts and so on which can certainly improve students' mathematical communication skills. Based on the explanation above, this article

was written with the aim of finding out how to implement a culture-based learning model to improve students' mathematical communication skills.

2. LITERATURE REVIEW AND HYPOTHESIS

Learning Model

The world of education has developed over time. Likewise, the learning models applied by teachers in the classroom range from passive, active, cooperative, innovative and constructive. The learning model is a conceptual framework that describes structured learning procedures in guiding students' learning experiences, so that learning objectives are achieved (Jamil Suprihatiningrum, 2013). This is in line (Trianto, 2010) opinion that a learning model is a programming or model that is used as a guide in implementing classroom learning or guided learning. A learning model must fulfill elements including syntax, social system, reaction principle, support system, instructional impact.

The success or failure of a model also depends on the teacher's ability to apply the model and combine it with learning material. A teacher must understand the syntax of a learning model, so that the expected learning objectives can be achieved.

Culture-Based Learning Model

Learning should utilize the environment as a learning resource. By utilizing the surrounding environment, it means inviting students to implement science in everyday life. This is meaningful learning. Culture is a habit that develops and is shared by a group of people, and is passed down from generation to generation (Kusniyati & Sitanggang, 2016). Around students there is a culture that includes clothing, dance, traditional houses, food, language, beliefs, habits and physical characteristics. All of this can be used in learning so that students can easily understand the learning material. Students prefer to learn things that are concrete and close to their surrounding environment. The teacher's task is to relate learning material to appropriate cultural concepts. Some of the benefits of culture-based learning are:

1. Make it easier for students to understand learning because what they learn is close to students' lives (Tanjung, H.S., 2020).
2. Enables students to pay attention to the depth of their thinking, their appreciation of the concepts or principles studied in a subject, as well as their creative imagination in expressing their understanding (Jacobus, 2018).
3. various subjects. Thus, through a culture-based learning model, students do not just imitate or accept the information conveyed, but students create meaning, understanding and significance from the information they obtain.

Students' Mathematical Communication Ability

According to (A. Susanto, 2013) mathematical communication can be interpreted as an event of dialogue or interrelationship that occurs in the classroom environment, where messages are transferred and the transferred messages contain mathematical material that students are learning, for example in the form of concepts, formulas or strategies. solving a problem. According to (Ontario Ministry of Education, 2005) Mathematical communication is the process of expressing mathematical ideas and knowledge using images, pictures and words to various subjects including teachers, colleagues, groups or classes. If you add the word "ability", then the meaning of mathematical communication ability is the ability to represent mathematical problems in a mathematical model correctly, explain ideas or strategies in the form of relevant descriptions, provide reasons or explanations for a statement (Purwandari et al., 2018). According to (Nofrianto et al., 2017) mathematical communication ability is a student's ability to convey information that they know through a dialogue or interconnected process that occurs in the classroom, where information exchange occurs. According to (Syasri et al., 2018) mathematical communication skills are an important component in learning mathematics which is related to

the activity of communicating mathematical ideas or thoughts orally or in writing so that the ideas become clear to oneself and others.

According to (Sumarmo, 2014) mathematical communication skills can be measured using the following indicators: (1) Expressing a situation, image, diagram, or real object into language, symbols, ideas, or mathematical models, (2) Explaining ideas, situations, and relationships verbally and in writing, (3) Listening, discussing and writing about mathematics, (4) Reading with understanding a mathematical presentation, (5) Developing conjectures, composing arguments, formulating definitions and generalizations, (6) Rephrasing a description or mathematical paragraphs in your own language. According to (Hodiyanto, 2017, indicators of mathematical communication skills include: (1) Writing, where students are able to explain their ideas and thoughts in their own language, (2) Drawing, where students explain their thoughts and ideas through pictures, graphs or in table form, (3) Mathematical expressions, where students are able to create mathematical models of the problems given. Mathematical communication in the problems they face. Mathematical communication can be interpreted as a student ability in conveying something he knows through dialogue or mutual events relationships that occur in the classroom environment, where message transfer occurs. Message which is transferred contains mathematics material that students study, for example in the form of a concept, formula, or strategy for solving a problem. Parties involved in communication events in the classroom are teachers and students. How to redirect The message can be verbal or written. In the learning process mathematics in the classroom, communication of mathematical ideas can take place between teacherwith students, between books and students, and between students and students.

3. RESEARCH AND METHOD

This research uses a literature review method. which was carried out by reviewing several libraries according to the title of the research being discussed. Literature studies are used to summarize, analyze, and interpret concepts and theories that are appropriate to the research conducted (Anderson & Arsenault, 2005). The literature was reviewed based on method, year of publication, and main findings.

4. RESULT AND DISCUSSION

In this literature study, articles that meet the requirements are reviewed to summarize and analyze their findings. Sources are evaluated for their suitability and relevance based on certain categories, namely culture-based learning models to improve students' mathematical communication skills. Based on the predetermined categories, 10 articles were selected for the review process and used as references in conducting this literature study. The ten articles are:

Table 1. Culture-Based Researchs

NO	Judul	Penulis
1	Development of Interactive Learning Media with Local Cultural Context to Facilitate Students' Mathematical Communication Skills on Social Arithmetic Material (Wardani et al., 2022)	1. Oktaviani Puspita Wardani 2. Heni Pujiastuti 3. Ihsanudin
2	Analysis of Mathematical Communication Skills through Culture-Based Blended Learning in View of the Student Answer Process (Sari et al., 2023)	1. Dwi Novita Sari 2. Irham Habibi Harahap 3. Hasratuddin 4. Kms. M. Amin Fauzi 5. Sahat Saragih 6. Elvis Napitupulu
3	Realistic Mathematics Learning in Educational Games Based on Local	1. Mikke 2. Novia Indriani

	Excellence to Build Mathematical Communication (Indriani & Imanuel, 2018)	3. Imanuel
4	Realistic mathematics learning based on Bengkulu community culture in improving students' mathematical communication (E. Susanto et al., 2021)	1. Edi Susanto 2. Rusdi Rusdi 3. Agus Susanta
5	Improving Mathematical Communication Skills Through Realistic Mathematics Education Containing Local Culture (Sumandya, 2019)	I Wayan Sumandya
6	STAD Type Cooperative Learning Based on Ethnomathematics as an Effort to Improve the Mathematical Understanding and Communication Abilities of PGSD Students (Tamur et al., 2021)	1. Maximus Tamur 2. Yaya S. Kusumah 3. Dadang Juandi
7	The Effectiveness Of Cultural Context Based Digital Learning Media In Improving Students' Mathematical (Aufa & Multina, 2022)	1. Mahrani Aufa 2. Mega Multina
8	Improving Junior High School Students' Mathematical Communication Skills Through Coastal Culture-Based Contextual Learning (Kleden et al., 2017)	1. Maria Agustina Kleden 2. Uda Geradus 3. Yoseph Sugi
9	Development of a Realistic Mathematics Learning Model Based on Mandailing Culture (PMR-B2M) to Improve Students' Mathematical Communication Skills (Khairunnisyah et al., 2023)	1. Khairunnisyah Khairunnisyah 2. Edi Syahputra 3. Faiz Ahyaningsih
10	The Effectiveness of the POGIL Learning Model with an Ethnomathematics Nuance Assisted by LKPD on Students' Mathematical Communication Abilities (Farda et al., 2017)	1. H Farda 2. Zaenuri 3. Sugiarto

Culture-based learning is the best momentum in improving students' mathematical communication. According to (Wardani et al., 2022) the development of interactive learning media with local cultural contexts is very useful and significantly in improving students' mathematical communication skills in social arithmetic material with the predicate "very feasible" obtaining an average percentage of 82.35% from the expert assessment. material and 93.33% of media expert assessments. Apart from that, the results obtained from student responses were 85.78% and the percentage of teacher responses was 84.78% with the criteria "very practical". So based on this, interactive learning media uses local cultural contexts to facilitate communication skills.

Research findings (Sari et al., 2023) show that the learning process by implementing culture-based blended learning can improve students' mathematical communication skills. In the applied learning process, students are given mathematical problems that are linked to culture. Review of the aspects of mathematical communication skills and error indicators when students are given culture-based mathematics questions on plane material material, namely: (1) the drawing aspect of the process skill error indicator is 8.00, so it is included in the high level of not making mistakes, (2) the mathematical expression aspect the indicator of transformation errors and misunderstandings is 8.22, so it is included in the high level of not making mistakes, and (3) the written text aspect of the

indicator of writing errors in answers is 7.77, so it is included in the high level of not making mistakes. In line with the discovery (Indriani & Imanuel, 2018) educational games based on local excellence in mathematics learning are able to attract students' interest and can build mathematical communication between students in discussions on solving mathematical problems.

If we look at the integration of the PMR approach with Bengkulu culture, it turns out that it can improve students' mathematical communication skills in basic statistics courses, Improvement is carried out with several actions, namely: (1) focusing on small groups, (2) describing realistic, culture-based problems at the beginning of learning, (3) emphasizing students in designing modeling, (4) preparing interactive LKM that can be done online (E. Susanto et al., 2021). Students who are given learning using realistic mathematics education containing local culture have better mathematical communication skills than students with a conventional approach. Apart from that, more than eighty percent of students have completed their mathematics learning (Sumandya, 2019).

The next researcher concluded that overall, the mathematical understanding and communication abilities of students who received learning using PKSBE improved significantly more than students who used PKS. This increase is in the high category, This increase is in the high category. The results of the analysis of observation data and student responses show that PKSBE can increase student learning activities and foster their positive attitudes towards lectures on Basic Mathematics Concepts. This research uses a qualitative approach, by making direct observations of the research subjects and then making it relevant to fine arts learning materials at junior high school level that are in accordance with the learning resources used, namely the Cipari Kuningan Archaeological Park Museum. (Tamur et al., 2021). On the other hand, digital media based on cultural context can be used as an alternative learning media to improve students' mathematical communication results, especially in remote areas which have limited facilities and infrastructure to make students more responsive to learning carried out in schools. Use of learning media in existing schools in very underdeveloped areas needed because it provides huge influence on learning process. Based on results of research carried out in Ibtidaiyah Madrasah is remote Peureulak sub-district area East Aceh Regency can concluded that learning carried out at each school who use digital media based on the cultural context it has improved communication results more significant mathematical and effective than the class using conventional learning for class V students the subject of wake volume cube and block space. This matter shows digital media based cultural context can be used as an alternative media learning to improve students' mathematical communication results especially in remote areas who have limited means and the infrastructure to make it students respond more the learning carried out in school (Aufa & Multina, 2022).

The virality of culture-based learning has made researchers flock to conduct research to solve the problem of mathematical communication skills by integrating local culture. Subsequent researchers (Khairunnisyah et al., 2023) succeeded in improving mathematical communication through the Mandailing Culture Based Index realistic learning model, The research results show that 1) the realistic mathematics learning model based on Mandailing culture meets the criteria of being valid, practical and effective; and 2) the realistic mathematics learning model is successful. 2) Improving mathematical communication through a realistic learning model. The Mandailing Culture Based Index shows an increase in normalization, and it is known that in the first trial, students' mathematical communication abilities were "low" with a score of 0.24 (g 0.3) and in the second trial with the criteria "medium" with a score of 0.34 (g 0.3) increase (0.3 N-Gain).

Next, (Kleden et al., 2017) stated that contextual learning based on coastal culture argued that the application of KBBP learning is one of the new learning models that creates they are more active in looking for learning resources and (Farda et al., 2017) stated that students' mathematical communication abilities using the POGIL learning model with ethnomathematics nuances assisted by LKPD are better than students' mathematical communication abilities using the PBL learning model. Based on research results and discussion, researchers provide suggestionsas follows; (1) preferably in research. Next, data collection on love attitudes local culture is implemented before and after treated POGIL learning model nuanced ethnomathematics assisted by LKPD so that it can

be seen that there is an improvement in attitudes love of local culture, (2) learning model POGIL has the nuances of assisted ethnomathematics LKPD would be better if implemented on main material with a minimum of 4 meetings, so that when each member is rolling groups can play a role in all four responsibility for the learning model POGIL, (3) should also be carried out research on the effectiveness of the POGIL model nuanced ethnomathematics assisted by LKPD towards mathematical communication skills oral.

5.CONCLUSSION

Culture-based learning shows a positive influence on students' mathematical communication. It can be seen that the mathematical communication of students who follow culture-based learning is better than students who follow conventional learning models, because culture-based learning provides opportunities for students to link concepts that are already real and already understood with the concepts to be studied so that it occurs. The learning process is meaningful and provides opportunities for students to play an active role in communicating the knowledge they have, so that students' communication skills can improve.

This form of implementing culture-based learning in improving mathematical communication skills has been widely implemented in schools. The results are very significant in improving the quality of students' mathematical communication skills. Based on the results of the research that has been presented, culture-based learning has succeeded in improving students' mathematical communication skills.

6. ACKNOWLEDGEMENT

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