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Kelengkapan Unsur Isi Prosiding (10%)			1,5			1,4
Ruang lingkup dan kedalaman pembahasan (30%)			4,5			4,3
Kecukupan dan						

kemutahiran data/informasi dan metodologi (30%)	4,4		4,5			4,4
Kelengkapan Unsur dan Kualitas Penerbit (30%)	4,4		4,5			4,4
Total = (100%)			15			14,5

Kontribusi Pengusul (Penulis Pertama/Anggota) = 0,2 X 14,5 = 2,9

Komentar/Ulasan Peer Review	
Kelengkapan dan Kesesuaian Unsur:	Kelengkapan dan kesesuaian unsur prosiding terpenuhi
Ruang Lingkup dan Kedalaman Pembahasan	Kajian dalam artikel ini bagus dan mendalam
Kecukupan dan kemutakhiran Data & Metodologi	Data dan metodologi yang digunakan cukup baik
Kelengkapan Unsur dan Kualitas Penerbit	Identitas penerbit jelas dan lengkap
Indikasi Plagiasi	Indikasi plagiasi rendah
Kesesuaian Bidang Ilmu	Kajian dalam artikel ini sesuai dengan bidang ilmu pengusul

Makassar, 10 Mei 2023

Reviewer 2

Prof. Syafruddin Side, M. Si., Ph.D
NIP 197202021997021002
Unit kerja: Fakultas MIPA UNM

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Analysis of Students' Metacognitive Skills in Problem-Solving Based on Ethnomathematics

Nuraimah Suharto[1*], Suradi[2], Nurwati Djam'an[3]
[1]Postgraduate Student of Mathematics Education, Universitas Negeri Makassar, Makassar, Indonesia
Email: nuraimahsuharto92@gmail.com
[2]Mathematics Education, Universitas Negeri Makassar, Makassar, Indonesia
Email: suradi@unm.ac.id
[2]Mathematics Education, Universitas Negeri Makassar, Makassar, Indonesia
Email: nurwati_djaman@yahoo.co.id

Abstract
This study analyzed students' metacognitive skills in solving ethnomathematical-based mathematical problems. The research method used is a descriptive analysis method with a qualitative approach. The research participants were selected by taking two subjects: students with achievements at the school level and students who excel at the district to national levels. Students who excel at the district to national levels tend to use or apply advanced thinking and heuristic thinking strategies in solving problems and are not tied to certain strategies in solving ethnomathematical nuances but instead refer to studies and characteristics of the problem. Meanwhile, students who excel at the school level are more likely to use forward-thinking strategies and cannot find mathematical problem-solving strategies on ethnomathematical nuanced questions with high mathematical analysis.

***Keywords**: Metacognition Skills; Problem Solving; Ethnomathematics.*

INRODUCTION

Education is the most important thing for humans in the dynamic development of science and technology. Mathematics is one of the sciences that has an important role in the world of education. In addition to being able to develop independently, mathematics also develops according to the demands of other fields. Therefore, mastery of the material in mathematics needs to be improved because it is related and widely used to solve problems in everyday life.

One of the factors that greatly influence the success of students in solving problems of which is metacognition. *McLoughlin* and *Hollingworth's* research reinforces this in Dwiani Listya Kartika (2020), which shows that effective problem-solving can be obtained by providing opportunities for students to apply their metacognitive strategies when solving a mathematical problem. Metacognition is a person's awareness or knowledge of the process and results of his thinking (cognition) and his ability to control and evaluate the cognitive process (Ayu Yarmayani & Silvia Fitriani., 2015). So Metacognition helps to problem-solve to recognize there is a problem that needs to be solved, to distinguish the problem.

Students skilled in metacognition will be good at measuring themselves so that when they are aware of their abilities, they will think strategically better than those not indifferent to the work of their own mental system (Panaoura et al., in Lia Fitria et al., 2020). So that problem-solving skills can be improved.

Students' metacognitive skills in solving mathematical problems do not just appear suddenly. The emergence of students' metacognitive abilities or skills cannot be separated from the teacher's learning process and the development of learning support facilities and infrastructure to assist students in

overcoming difficulties in understanding mathematics. Various efforts to improve the quality of education need to be carried out, including teacher training, the development of learning facilities and infrastructure and supporting learning resources. Learning resources are something related to students' learning experience efforts (Suyanto & Jihad, 2013). One of the learning resources that can be developed is teaching materials. Teaching materials are systematically arranged to create an environment/atmosphere that supports students' learning (Depdiknas in Erika Dwi Anggraenia & Nuriana Rachmani Dewi, 2021). One of the subjects that require the development of teaching materials in mathematics. So in realizing an effective and efficient learning process in mathematics subjects, a teacher needs to develop teaching materials and learning tools to help the strategies succeed in developing teaching materials, or student worksheets can use the learning process. Problems around students. One of them with a cultural approach.

In the midst of the development of educational technology, the educational curriculum also demands cultural involvement in learning in schools with the aim that students can become a generation of character and maintain and preserve culture as the foundation of the nation's character. Cultural values are essential to be instilled in each individual from an early age so that each individual can understand better, interpret, appreciate and realize the importance of cultural values in carrying out every activity of life. Culture describes the character of a nation, and Indonesia is a country rich in culture. The treasures of Indonesian culture also have a rich variety with a national character pattern. Therefore, the next conception of education must be combined with cultural values. The most rational reason is that the culture of a nation is never static. He is always dynamic and adapts dialectically and creatively to the dynamics of society. Sometimes he influences, and vice versa, is influenced by society. Culture flows in an endless motion of mutual influence in the pulse of life (Creative Team LKM UNJ, 2017. Triana Ayu Oktafiani, 2020). Therefore, using a cultural approach to raise awareness of students' metacognition so that they can solve mathematical problems well is a form of an effective and efficient learning process. According to D'Ambrosio, this approach is called an ethnomathematical-based approach.

By applying ethnomathematical-based questions in mathematics learning, it is expected that students will be able to improve their metacognitive skills in solving mathematical problems both routinely and non-routinely and be aware of their use. In addition, this can also help teachers in instilling cultural values themselves in students. So based on this background, the authors are interested in studying how the Metacognitive Skills Analysis of Students in Ethnomathematical-Based Problem-Solving at MAN 1 Polewali Mandar.

METHOD

This research is a descriptive-analytic study with a qualitative approach. The metacognition skills in problem-solving can be seen from the provision of the Mathematical Problem Solving Test (TPMM) given and followed by in-depth interviews.

The subjects in this study were MAN 1 Polewali Mandar students who had excelled at the district to national levels and students who had achieved at the school level. The determination of the participants of this research is based on the results of the mathematical problem-solving test given by the researcher. The number of subjects in this study consisted of 2 people and met the criteria in question. The selection of participants was based on the following considerations: (1) students who had won mathematics competitions at least the district to national levels and students who had school achievements; (2) students who could solve and apply mathematical problem-solving strategies properly and correctly.

The main instrument in this research is the researcher himself or the *Human instrument*. Where the *Human instrument* functions to determine the focus of research, select informants or subjects as data

sources, collect data, assess data quality, analyze data, interpret data and draw conclusions from their findings. So the researcher here is a key instrument in qualitative research (Sugiyono, 2013). The other supporting instruments are ethnomathematics-based Mathematics Test Sheets and Interview Guidelines to analyze students' metacognitive skills in problem-solving.

The procedure adopted in this research is divided into two stages, namely: (1) the preparation stage, namely by observing the research site, designing research instruments, validating the instruments that the researcher has made by expert validators, and (2) the implementation stage, namely by conducting ethnomathematics-based mathematics tests on several selected research subjects, checking the test results of these outstanding students and seeing more subjects who answered correctly and according to mathematical rules in answering questions as well as interviewing two eligible research subjects to obtain more information so that they can conclude the analysis of metacognitive skills possessed by outstanding students in ethnomathematics-based mathematical problem-solving strategies (Mandar Traditional House).

Furthermore, the data collection technique used in this study is to provide a mathematical test in the form of routine and non-routine descriptions followed by in-depth interviews to determine what strategies or techniques the subject uses in solving ethnomathematical-based mathematical problems. The analysis of students' metacognitive skills in solving this problem is to analyze skills in applying mathematical problem-solving strategies used by students, wherein problem-solving cognitive strategies can be applied, which include: (1) the use of heuristic strategies, (2) forward-thinking strategies, (3) backward thinking strategies, (4) inductive strategies, and (5) deductive strategy, (6)Strategies to see or analyze patterns, (7) Strategies to use assistance, (8) Strategies to change the perspective on problems, (9) Strategies to organize data, (10) Strategies to create tables, (11) Strategies to systematically calculate all possibilities, (12) Guess and check strategy (guess and check), and (13) open sentence writing strategy (Nurdin Arsyad, 2016).

Furthermore, all data obtained during the interview, test, and free conversation were recorded using a cellphone audio recorder or the Recorder application on an android cellphone. The data collection outside questionnaires, tests, and interviews was carried out by observation, and data was collected in small notes. After the data is obtained, data reduction is carried out (summarizing, choosing the main things, and focusing on the important things) on the data that has been received. Then analyze the results of the tests and interviews given to the two subjects. Next, compare the results of field observations on the two so that the results are used as a reference in compiling and interpreting the data to make conclusions. As for the test results, which are often not carried out, they are still collected for data verification purposes.

In this study, the researcher checked the validity of the data by testing the validity the data, which included; testing credibility (internal validity), transferability (external validity), dependability (reliability), and confirmability (objectivity) (Khairul Aziz et al. 2020). The data credibility test is focused on the triangulation method. The metacognition skills questionnaire focused on the triangulation method, namely, giving tests and interviews with data sources carefully and thoroughly. Transferability testing is conducted by compiling a clear, systematic, and reliable research report and describing in detail the metacognitive skills of outstanding students in ethnomathematical-based mathematical problem-solving strategies. Furthermore, the dependability test is carried out by conducting an audit of the entire research process. And the confirmability test is similar to the dependability test, so the tests can be carried out simultaneously. Testing confirmability means testing the research results associated with the process carried out.

Then in data analysis activities, researchers used the Miles and Huberman model to analyze existing data. The model is to carry out the stages that begin with collecting data, reducing, displaying data, and verifying or drawing conclusions (Mely Novasari Harahap, 2021). The steps taken in analyzing the data are: (1) Collecting Raw Data. (2) Data reduction, namely, at this stage, the data is in the form of a metacognitive skill test in mathematical problem-solving strategies, followed by in-depth

interviews, which are presented in a more concise narrative form or, in other words, the researcher summarizes, selects data, simplifies, focusing, and grouping the data that has been obtained. After that, the researcher abstracts or makes a summary of the data. (3) Data display (*data display*), where the researcher assembles information and checks the validity of the research data to conclude. Through the presentation of the data, the data is organized and arranged in a pattern of relationships so that it will be easier to understand. (4) Verifying data (*conclusion drawing*) where the researcher concludes, analyzes, and decides how to analyze his metacognitive skills in mathematical problem-solving strategies through interviews. (5) Make a report on research results.

RESULT AND DISCUSSION

Result

1. Interpreting Data Analysis of Metacognition Skills in solving mathematical problems with ethnomathematics-based (Mandar Traditional House) on the First Subject (SM1)

The overall strategy can be described as a table first to analyze metacognitive skill data, specifically on the use of the strategy applied by the first subject (SM1) in completing the TPMM. With reference to the explanation of the test and interview results, the data described are as follows.

Table 1. Strategies Applied By Subject SM1 to TPMM

TPPM to- Strategy	01	02	03	04
Thinking Forward	√	√	√	√
heuristics	√	√	–	√
Calculate all possibilities systematically.	–	√	√	–
Viewing or Analyzing Patterns	√	–	√	–
Write open sentences	√	–	–	–
Think Back	–	–	–	–
Inductive	–	–	–	–
Deductive	–	–	–	–
Strategy Using Help	–	–	–	–
Changing the way you look at the problem	–	–	–	–
Organizing Data	–	–	–	–
Create Table	–	–	–	–
Guess and Check (Test)	–	–	–	–

Table 1 shows that in the first subject (SM1), female students at the district to national level tend to use forward-thinking and heuristic strategies. This can be seen from the four questions given to the participant: SM1 was dominantly answered correctly and applied to the four questions in solving mathematical problems. As for several other strategies, their use is adjusted to the characteristics of the existing questions. So it can be concluded that students who excel at the district to national level are not tied to a particular strategy in solving problems but instead refer to the characteristics of the problem.

2. Interpreting Data Analysis of Metacognition Skills in solving mathematical problems with

ethnomathematics-based (Mandar Traditional House) on the Second Subject (SM2)

To interpret the data on metacognition skills, specifically on the use of strategies applied by the second subject (SM2) in completing the TPMM, first, the overall strategy can be described in tabular form. With reference to the explanation of the test and interview results data that have been described, which are as follows:

Table 2. The strategy applied by the SM2 Subject to the TPMM

TPPM to- / Strategy	01	02	03	04
Thinking Forward	√	√	–	√
heuristics	–	–	–	–
Calculate all possibilities systematically.	–	√	–	–
Viewing or Analyzing Patterns	–	–	–	√
Write open sentences	–	–	–	–
Think Back	–	–	–	–
Inductive	–	–	–	–
Deductive	–	–	–	–
Strategy Using Help	–	–	–	–
Changing the way you look at the problem	–	–	–	–
Organizing Data	–	–	–	–
Create Table	–	–	–	–
Guess and Check (Test)	–	–	–	–

Discussion

Being an outstanding student is a matter of pride for students, so each student competes to become an outstanding student in his school. Especially if it's an achievement in a competition in the field of mathematics, however, achievement in a mathematics competition cannot be achieved without an effort, and that effort is through learning. Learning, according to Thursan Hakim in Mahrani Dita Putri & Junierissa Marpaung (2018), is a process of change in the human personality, and these changes are shown in the form of increasing the quality and quantity of behavior such as increasing skills, knowledge, attitudes, habits, understanding, skills, thinking power, etc. So effective learning can help students improve their expected abilities per the instructional goals. Therefore, this research discusses metacognitive skills possessed by outstanding students in mathematics, especially in solving mathematical problems used by outstanding students in solving ethnomathematical problems in traditional houses and having high analysis.

Meanwhile, based on the research analysis results, the participants applied problem-solving strategies according to the tests and the results of interviews conducted by researchers at the MAN 1 Polewali Mandar. It turns out that female subjects (SK1) and male subjects (SK2) both tend to use forward-thinking strategies in solving problems-ethnomathematics-based (Mandar Traditional House) questions as well, as both of the participants also use or combine other strategies in solving math problems such as; heuristic strategies, strategies to calculate all possibilities systematically, strategies

to see or analyze patterns, and strategy to change perspective. So it can be said that both are not tied to a particular strategy in solving the problem but rather refers to the characteristics of the problem.

So the application and integration carried out by outstanding students is nothing but to adjust which strategy is appropriate and suitable for solving problems so that the problem can be solved correctly and correctly so that such a strategy is used. This is in line with the theory expressed by Nur in Sitti Nursiah (2013), which explained that cognitive monitoring is the ability of learners to choose, use, and monitor appropriate learning strategies according to their learning style to the task situation or problem at hand. Regarding the importance of this cognitive monitoring activity, Winkel in Sitti Nursiah (2013) argues that: "Although students are given various cognitive strategies that can be used in solving certain problems, it does not mean that these strategies can be used for all kinds of problems. Finally, students must absorb the strategy and determine which strategies suit problems A and B. In other words, flexibility in thinking. Therefore, the strategy used by outstanding students in solving ethnomathematical-based questions in this study are; forward-thinking strategies, heuristic strategies, strategies to calculate all possibilities systematically, strategies to see or analyze patterns, and open sentence writing strategies. While another strategy of the 13 strategies contained in the problem, neither apply. This is because the strategies they understand and use are the usual strategies they often get during guidance, learning, and working on similar questions. So that they have more control and understanding in this way than in other ways, it can be interpreted indirectly that the two subjects in applying mathematical problem-solving strategies are still adopting or duplicating, or imitating what has been taught by the teacher. This is in line with Bandura's Learning Theory in Qumruin Nurul Laila (2015) which can be regarded as *social learning*. Children learn from imitating what other people do, so the environment is an important factor influencing behavior and actions. Although in fact, the cognitive process is no less important. Where humans can control their patterns, however, from the theoretical basis, it can be said that the implementation of these strategies is also influenced by external factors, namely what the teacher teaches.

Furthermore, if it is reviewed as a whole and more intensely than what has been described above, there are several similarities and differences in the strategies applied by the two. The similarities in using this strategy occur because the two subjects are both outstanding students. So that they understand and are accustomed to solving or solving mathematical problems, they must use such strategies, especially in solving ethnomathematics-based questions. And also comes from the same environment and teacher, producing the same strategy. Then the difference in strategy can be seen in the incompleteness of male subjects (SK1) in solving mathematical problems. Meanwhile, based on the conclusions that the researcher explained earlier on the exposure and interpretation of the research data, the prominent difference lies in the inability of the male subject to solve problems related to algebra and geometry theory. He tends to be forgetful, while the female subject relates to the theory of geometry, so the use of strategy both are also different.

Then related to the geometry problems given to both subjects, it was found that both subjects were easy to solve the questions given because students were accustomed to solving contextual problems in learning taught at school. The teachers of the two outstanding students often used contextual-based mathematics teaching materials, especially in their own local culture. So it can be said that ethnomathematics-based mathematics teaching materials are proven effective in problem-solving skills. When students learn to use teaching materials or modules with ethnomathematical nuances, they get good results. This is because the learning process carried out by students will be effective with the help of teaching materials or modules with ethnomathematical nuances. In terms of the learning process, ethnomathematics can collaborate with learning strategies to create good learning outcomes. This answers the question Amor et al. (2016) obtained using a questionnaire where students feel uninterested in learning mathematics if the material conveyed is unrelated to everyday life (ethnomathematics).

From this opinion, it can be seen that teaching materials that apply ethnomathematics in them can help

students hone problem-solving skills. This can be seen from several factors, including more focused learning, the use of cultural content in learning, and ethnomathematics that can collaborate with learning methods and strategies so that learning can be more effective. So that it can be concluded that students' problem-solving ability can also be improved by carrying out learning that applies or uses ethnomathematics in it, such as teaching materials or learning media. Various types of diverse cultures will make students more interested and even able to improve their problem-solving abilities from within.

CONCLUSIONS AND SUGGESTIONS

Metacognition skills in solving mathematical problems containing ethnomathematics at the Mandar traditional house for students with Olympic achievements at MAN 1 Polewali Mandar, namely: Students who excel in mathematics olympiads tend to use or apply forward-thinking strategies and heuristic thinking strategies in solving problems and are not tied to certain strategies in solving problems ethnomathematics but instead refers to the study and the characteristics of the problem. Meanwhile, students with moderate achievement in school are more likely to use forward-thinking strategies. They cannot find mathematical problem-solving strategies on ethnomathematical nuanced questions, especially in Mandar traditional houses with a high analysis of mathematical studies. As for in this study, it is suggested that students be more active in working on various kinds of math problems that have different levels of complexity and that teachers should further improve the quality of techniques in teaching methods, discuss questions that are students' weaknesses, create an atmosphere that is conducive to learning. Comfortable and not boring; make assignments and exercises related to non-routine material or questions. So that students are familiar with questions that have high analysis. Then the results of this study are also expected to be applied in the learning process at school for other students so that it positively influences student learning outcomes in general.

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