ANALYSIS OF STUDENTS' NUMERATION LITERACY LEVELS IN SOLVING HOTS QUESTIONS BASED ON ETHNOMATHEMATICS

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ABSTRACT

Three abilities are necessary for pupils to master in the twenty-first century: competency, literacy, and character quality. The development of pupils' thinking and reasoning skills—which are closely related—can be facilitated by numeracy literacy. The purpose of this study is to characterize students' proficiency in numeracy in answering higher-order thinking skill (HOTS) questions based on ethnomathematics. The purpose of the preparation of the questions is to assess students' comprehension of the material by giving priority to their numeracy and literacy abilities. The research subjects for this descriptive qualitative study are the seventh-grade pupils of AZ-Zikra Integrated Islamic Middle School for the 2023–2024 school year. Tests and interviews are the methods used in this study to gather data. With a percentage result of 55%, it was determined that students' numeracy literacy abilities were dominating at a low level. A total of 33 test-takers were picked from 6 students at different levels for interviews to support the study findings.

INTRODUCTION

Numeracy literacy has grown in importance for pupils to acquire in the twenty-first century. Students' capacity to think and reason rationally when addressing problems is indirectly directed by the numerous government policies that exist in the educational system. This is consistent with the description provided by Ate & Lede (2022) of the skills that students need to possess, which are literacy, competence, and quality of character. These three skills essentially call for the ability to think and reason on the part of the students. The pupils' numeracy literacy skills, which emphasize critical thinking and reasoning, are strongly linked to all of these abilities.

The National Examination (UN) is being phased out in favor of a national evaluation as part of a government policy. The reason for the National Examination's elimination is that it includes questions that are classified as Lower Order Thinking Skills (LOTS), which causes students to have low numeracy literacy and makes them unable to compete on a global scale. Because of this, the government substituted the Minimum Competency Assessment (AKM) for the National Examination. AKM is an assessment, according to Kusuma & Nurmawanti (2023) that attempts to give pupils more inventive, creative instruction with an emphasis on evaluation, analysis, and reasoning abilities.

Students' insufficient numeracy literacy abilities, which prevent them from competing on a global scale, are another factor contributing to this shift. The Ministry of Education and Culture (2022) has released the PISA (Program for International Student Assessment) results, which are meant to measure the reading, math, and science competency of Indonesian students. The evaluation is conducted every three

years. Between 2015 and 2018, the average reading proficiency score of Indonesian students decreased. In 2015, Indonesian students' average reading competency score was 397, compared to the 493 OECD average. However, in 2018, the average reading ability score was just 371 compared to the 487 OECD average. In 2018, Indonesia was ranked sixth from buttom out of 74 countries that took the test. Thus, it may be said that reading competence among Indonesian students is still rather poor.

According to Rusminati & Rosidah (2018) the School Literacy Movement (GLS) initiative is one way the government is working to help Indonesian children become more proficient readers. The goal of this literacy movement is to help pupils become proficient readers who can decipher and understand written materials. Understanding what you read is a difficult task. This is consistent with the assertion made by Kintsch & Kintsch in Rusminati & Rosidah (2018) that reading comprehension is a complex process.

According to Elendiana (2020) one of the reasons Indonesian pupils struggle to grasp the lessons their teachers are trying to teach them is because they have low literacy and numeracy levels. One resource that helps pupils read for new information is books. In order for pupils to comprehend the content of every piece they read, it is imperative that their literacy and numeracy skills be improved. One method of honing these pupils' reading and numeracy skills is to provide questions in the style of High Order Thinking Skills (HOTS).

Teachers can work to improve their students' reading and numeracy abilities by giving assessments in the form of examinations based on the HOTS framework. Pratiwi et al. (2023) claim that it has been demonstrated that using HOTS-based questions helps students become better thinkers, reasoners, and actors. This particular question can be used as a technique or instrument to gauge pupils' proficiency, particularly in higher order thinking. Giving pupils questions that are based on the HOTS might therefore motivate them to advance their skills. Developing kids' reading and numeracy abilities is in accordance with this. The results did, however, continue to show that pupils were unable to respond to inquiries. This paper examines how well students can solve HOTS problems based on ethnomathematics using their reading and numeracy skills.

METHOD

To describe students' ability to respond to questions of the Higher Order Thinking Skill (HOTS) type that are based on ethnomathematics, descriptive qualitative research approach is used. The study's data sources were the student interviews and their answers to questions regarding literacy and numeracy. In the qualitative descriptive research technique, the data collected through questionnaires, tests, or interviews is meant to create a description or image of an event, fact, or collection of circumstances. This is in line with the definition of descriptive qualitative research provided by Ate & Lede (2022) which is a type of study that aims to describe or illustrate a reality about a variable, situation, symptom, or particular social phenomenon.

In order to accomplish the goals of the study, this research method is utilized to thoroughly and in-depthly evaluate the data collected. The AZ-Zikra Integrated

Islamic Junior High School in the Pancoran Mas District of Depok City, West Java, was the site of this study. kids in class VII are the research subjects, and the main objective of the study is to analyze how well-versed in numeracy these kids are when it comes to answering HOTS questions that are grounded in ethnomathematics.

The research procedures carried out were 1) The researcher interviewed math teachers; 2) The researcher selected research subjects; 3) The researcher gave research subjects questions from a numeracy literacy test; 4) The researcher categorized students based on test results; 5) The researcher chose students as samples to be interviewed based on each categorization; 6) The researcher concluded the research findings. Data reduction was used to evaluate the data, moving from the numeracy literacy test results to the student interview outcomes.

RESULTS AND DISCUSSION

33 students participated in this study, working on 10 descriptions-based numeracy literacy questions using the ethnomathematics-based HOTS question type. The test's findings indicate that most of the pupils at AZ-Zikra Integrated Islamic Middle School have low levels of numeracy literacy.
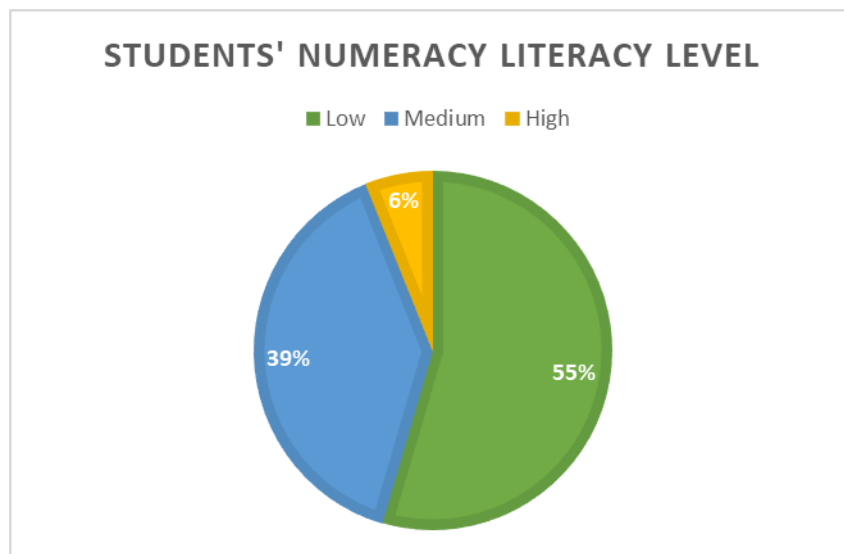

Figure 1. Percentage of Student Numeracy Literacy Test Results

Based on exam results, Figure 1 displays students' numeracy literacy abilities; the majority of pupils are at a poor level. 55% of pupils performed at a low level, 39% at a medium level, and only 6% at a high level when working on numeracy literacy issues. Due to the extensive reading required to answer some questions, students find it difficult to comprehend them and hence are unable to provide their best answers.

A sample of research subjects for each category—low, medium, and high levels—is shown below.

Table 1. Research Samples Based on Each Category

Student Initials	Correct Amount	Ability Level
PAV	1	Low
IKM	3	Low
MFA	4	Medium
MD	5	Medium
SHS	7	High
HN	7	High

Grouping and collecting study samples according to each category level is the next step after receiving the results of the numeracy literacy exam. To support the findings of the administered numeracy literacy exams, the answer sheets of the students who had been chosen as research samples were examined further, and research samples were also interviewed. Two students with low, two students with medium, and two students with high levels of numeracy literacy made up the samples. The questions about numeracy literacy and examples of some of the students' responses are described below.

Question 1:

Students are given the following numeracy literacy questions using the ethnomathematics-based HOTS question style. The real task at hand is figuring out a triangle's perimeter.

Table 2. Literacy Score for Question Number 2

Source: suarakonsumen.co (google)

A traditional dish from South and West Sulawesi Province (SulSelBar) called "tumpi-tumpi" is created with a combination of crushed fish flesh, shredded coconut, tapioca flour, and spices. This common dish has a triangular form. What is the circumference of the meal if its sides are known to be 5 cm long and its shape is that of an equilateral triangle?

Based on each student's skill level, some student responses are included below.

Table 3. Results of Student Answers to Question Number 2

Low	Medium	High

Question 2:

The following are numeracy literacy questions that are presented to students using the HOTS question style based on ethnomathematics. In reality, this problem is only about figuring out the kite's area.

Table 4. Literacy Score for Question Number 5

 Source: indonesia.jakartadaily.id (google)	Playing kites is a classic pastime that involves using wind and skill to pull and stretch strings to propel the aircraft into the air. Paper is affixed to a kite-shaped frame to create this kite. How much paper area is needed to create the kite if the diagonals of the kite are known to be 10 and 20 cm?

Based on each student's skill level, some student responses are included below.

Table 5. Results of Student Answers to Question Number 5

Low	Medium	High

Question 3:

The following are numeracy literacy questions that are presented to students using the HOTS question style based on ethnomathematics. This difficulty may be solved by utilizing a square shape's area.
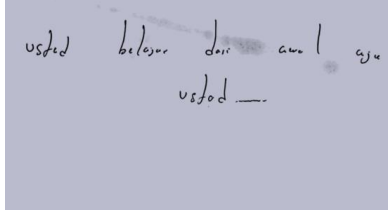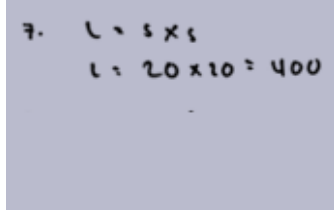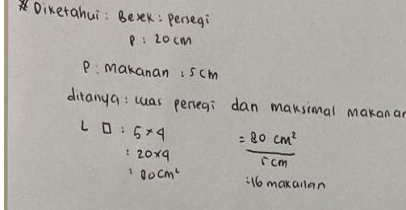
Table 6. Literacy Score for Question Number 7

Source: lazada.co.id (google) | Besek is a type of traditional bamboo skin storage container. Usually, this bamboo basket is used to hold food. This basket has a square form. The basket's side is 20 centimeters in length. If food is square-shaped and has sides that are 5 cm long, how much food can fit in the basket at its maximum? |

Based on each student's skill level, some student responses are included below.

Table 7. Results of Student Answers to Question Number 7

Low	Medium	High

Analysis of Low Numeracy Literacy Level Students' Results

A score of 10 out of 100 was awarded to the student with the initials PAV who had the lowest level of numeracy literacy. After then, the kid was asked directly what was preventing him from responding to the questions. During the interview, the kid disclosed that he struggled to grasp mathematics lectures, which made it difficult for him to answer questions in any format. All that piqued his attention were the images, which he felt extended mathematics beyond just numbers. He did admit, though, that the volume of writing indicated that he was not understanding the questions. The kid said that he answered the questions to the best of his ability because he was having trouble understanding them. The outcomes of the test work and interviews suggest that the student's numeracy literacy skills are below average. Therefore, in order to improve numeracy literacy abilities and the capacity to comprehend the questions' themes, practice questions in the form of HOTS are still necessary.

The pupils with the initials IKM who had the second-lowest level of numeracy literacy abilities were interviewed next. The kid received a score of 30 out of 100 according to the test results that were administered. This interview was place right there in the school. The second student claimed to have never before encountered a question such as this one. The student did add, though, that he recognized the questions were about the area or perimeter of many flat objects at the finish of the questions. The student said that he did not know and that he had previously learned

about area or perimeter but was not told what the components were. This led to the question of which parts were included in the area and which parts were included in the circumference. In addition, the student said that the questions had an excessive amount of reading. As a result, he becomes lethargic and has trouble comprehending the questions. Based on the outcomes of the administered exams and the conducted interviews, it seems that these pupils have poor levels of numeracy literacy. In order to help with this, the student is instructed on the value of reading and completing additional practice questions so that in addition to being able to answer the questions correctly, he will also be able to comprehend their true meaning.

Analysis of Medium Numeracy Literacy Level Students' Results

With the initials MFA, the first student with moderate reading and numeracy abilities receives a score of 40 out of 100. Direct interviews were place at the educational institution. Inquire of the kids about the things that they find challenging while working on questions. The student said that the primary challenge he had was that there was an excessive amount of reading on the questions, which made pupils more likely to be indolent when they saw them. The student did, however, add clarify that he was able to locate the solution when he attempted to read the question. The kid said that he didn't read too much and that he completed the questions based on the ones he selected. This is because he finds it difficult to grasp what he reads too often. Based on the outcomes of the administered exams and the conducted interviews, it seems that the student's aptitude is on the medium side. But in order to achieve the best outcomes, you must read and practice a lot of questions. This will help pupils grow more used to answering questions that require a lot of reading when they encounter them.

With the initials MD, the second student, who possesses intermediate literacy and numeracy abilities, receives a score of 50 out of 100. Direct interviews were place at the educational institution. Inquiries begin with the challenges that students face while responding to inquiries. The second student, who had talents on the medium level, said that he struggled with time management and left a lot of things unanswered. This is because the questions need a lot of reading, and it will take him a long time to read and comprehend them. To ensure he could correctly answer the questions, the student did clarify that many of the questions simply inquired for the area or perimeter of flat objects. The student spent a lot of time working on questions because he believed that his poor reading comprehension was a hindrance. It may be inferred from the exam and interview findings that the student has a modest level of numeracy literacy abilities. In this approach, students can increase their reading proficiency and work on problems more quickly by simply being taught and acclimated to working on topics that require a lot of reading.

Analysis of High Numeracy Literacy Level Students' Results

First, students with strong reading and numeracy skills receive a score of 70 out of 100, indicated by the initials SHS. Direct interviews were place at the educational institution. The questions begin by posing what challenges the pupils are having answering the questions. The first very capable student gave an explanation of how

processing time limited him. It was evident from reading the lengthy questions that he was running out of time. The youngster said that since he had studied the subject in elementary school, the question was not that tough after all. On the other hand, a more thorough comprehension of the questions is required when the content is presented as a series of reading-intensive HOTS questions. Pupils can also explain the questions and provide detailed answers, but they still struggle with reading quickly enough, which causes them to run out of time when answering the questions. The student also offered advice on how to complete the questions, saying that he should read more quickly and concentrate in order to comprehend the questions' content and be able to answer them. The student is classified as high level based on the outcomes of the exams and interviews that were done. It's evident from the way the students describe the questions and offer advice on how to answer them; they simply need to practice reading at a faster pace.

The second student, initials HN, had a score of 70 out of 100, indicating strong numeracy literacy. Direct interviews were place at the educational institution. The same questions are still being asked, which concern what challenges or problems were encountered when attempting to answer the inquiries. The student clarified that he ran across issues while working. This is because answering the questions requires a significant amount of reading, which makes it time-consuming. Additionally, he clarified that answering the questions just required a significant amount of time and wasn't really challenging. The student stated that he liked questions like these because, in addition to being able to work on the questions, the precise explanations allowed him to see the questions in their actual form. The student said that he learned a great deal of fresh information about Indonesian cultures from the questions, which he had not previously known. The kid was placed in the high levels group according to the outcomes of the exams and interviews that were done. This is evident in the way the students answered the questions and presented their ideas. To become accustomed to it and avoid running out of time while answering questions, pupils must still improve their reading speed.

CONCLUSION

Studies show that students are less proficient in providing ethnomathematics-based answers to HOTS questions. This is primarily due to students' poor reading comprehension, thus it is critical that they improve their reading abilities so that they can get used to it and fully understand the questions. There were ten questions with flat, ethnomathematics-based answers. Of the thirty-three students who answered this question, six percent were at a high level, fifty-five percent were at a low level, and seventy-five percent were at a medium level. Test findings and interviews with study samples collected at each category level suggest that most students at AZ-Zikra Integrated Islamic Middle School have low numeracy literacy abilities.

Based on the findings of this study, pupils' numeracy literacy abilities need to be improved. This may be achieved by regularly assigning practice questions based on HOTS questions to students, which will help them become accustomed to answering problems requiring extensive reading and sophisticated logical reasoning. It is thus envisaged that educators would be able to focus more on kids in order to

determine the amount of their literacy in numeracy. In order to prevent pupils from being lazy when reading the questions, teachers should also present a variety of questions and emphasize numeracy literacy abilities.

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