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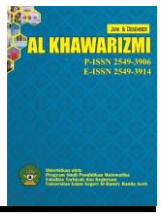

-ANALYSIS OF JUNIOR HIGH SCHOOL STUDENTS' NUMERACY LITERACY IN SOLVING MINIMUM COMPETENCY ASSESSMENT MODEL (AKM) QUESTIONS ON NUMBER

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Abstract

This research aims to describe and analyze the numeracy literacy abilities of junior high school students in solving AKM model questions on number content. The research method used in this research is qualitative descriptive research with a case study type of research. The research subjects studied were 36 students in class VII-G of SMP Negeri 7 Serang City who had received material on whole numbers and fractions. The research instrument used was the AKM model questions consisting of three descriptive questions which had been adjusted to the numeracy literacy indicators. The written test results were analyzed based on numeracy literacy indicators and then strengthened by the results of student interviews. The research results show that students' numeracy literacy skills in solving AKM model questions on number content are still not good. Because students are unable to meet the three numeracy literacy indicators. Students' numeracy literacy abilities are predominantly in the medium category. In solving AKM model questions on number content, students with high and moderate abilities experienced calculation errors in the results of addition, subtraction, multiplication and division. Students with low abilities have difficulty determining solution strategies and understanding the concept of arithmetic operations of addition, subtraction, multiplication and division on whole numbers and fractions as well as in calculating discounts.

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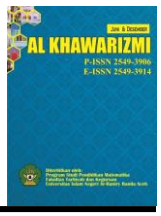

INTRODUCTION

Learning is a process of changing a person's personality for the better, namely improving cognitive abilities, skills, attitudes, thinking power, understanding and various other abilities (Djamaluddin & Wardana, 2019). The learning process that occurs in each individual is important, because through learning individuals can get to know the environment and adapt to the surrounding environment (Prafitriani et al., 2022). A person's learning process, both formal and non-formal, will of course acquire various kinds of new knowledge and knowledge, one of which is mathematics.

Mathematics is a collection of ideas that are abstract and obtained from experience or facts based on a person's reasoning so that it plays an important role in developing science and technology (Patri & Heswari, 2022). Mathematics is a science that has many benefits in life, especially in solving problems. Therefore, by studying mathematics, it is hoped that students will be able to think critically and logically in solving every problem they face.

The aim of learning mathematics is so that students can apply it in social life, namely that students are able to communicate and find new ideas, think logically, be thorough and careful (Brahmansyah, 2019). So it can be concluded that mathematics has an important role in life and must be studied and mastered by every individual.

Mathematics can be found easily in life, so students are required to be able to understand basic mathematical concepts and relate them to the problems they face to solve problems that occur in their lives. This ability is an ability that students must master, namely numeracy literacy skills (Kaka et al., 2021).

Numeracy literacy is a person's ability to develop knowledge and skills using mathematics. According to Susanto (2021) numeracy literacy is knowledge and skills in using various kinds of numbers and mathematical symbols to solve problems, analyze information to interpret analysis results in decision making. Because this ability has an important role in life, students must master numeracy literacy skills. With this ability, students can have knowledge and skills in solving mathematical problems in social life.

Tests that measure numeracy literacy skills are PISA and TIMSS (Ate & Lede, 2022). PISA results from year to year show that the numeracy literacy skills of junior high school students in Indonesia are still relatively low. In 2018, Indonesia received a mathematics literacy score of 379 out of 490 (OECD, 2019). Then in 2022, Indonesia's mathematics literacy score fell by 13 points, to 366 (Kemendikbud, 2023). Meanwhile at TIMSS in 2015, Indonesia obtained a mathematics score of 395 out of 500 (OECD, 2016). These results show that there is no significant difference with the PISA results in the previous year.

Several factors that can influence this are students' lack of familiarity with working on non-routine questions as well as individual conditions related to mathematical skills, enthusiasm for learning, and self-confidence which influence students' low mathematical literacy (Lestari & Effendi, 2022).

In line with research by Khoirunnisa & Adirakasiwi (2023) which shows that the level of numeracy literacy skills of class VIII middle school students is still low. Apart from that, research by Tobondo (2015) also stated that more than 70% of class VIII junior high school students experienced difficulty in working on PISA questions at levels 4, 5 and 6.

One of the efforts made by the minister of education regarding the low numeracy literacy of students in Indonesia is to make changes to the National Examination with a National Assessment, where the national assessment includes three parts including, Minimum Competency Assessment (AKM), Character Survey, and Environmental Survey (Education, 2019). AKM is an assessment that considers students' basic numeracy literacy skills with the aim of seeing the extent of students' abilities in numeracy literacy skills (Fauziah et al., 2021). This AKM measures students' literacy and numeracy skills at each level of education, namely grades 5, 8 and 11 (Asrijanty, 2020).

One of the contents tested in AKM is numbers. Number content is basic mathematical material that every student must master, because this content is widely used in life. However, there are still many junior high school students who lack mastery of number content, especially in understanding concepts and completing arithmetic operations. Based on research by Murtiyasa & Wulandari (2020), it shows that class VII students at SMP Muhammadiyah 2 Surakarta still experience errors in understanding, transformation errors, process skills errors, and errors in writing answers when working on story questions on fractional number material.

Furthermore, research by Kaka et al. (2021) regarding the numeracy literacy abilities of students at SMPN 1 Tambolaka City, research results showed that 65% of students had the ability to use numbers and symbols related to basic mathematics to solve problems in life, then 17% of students were able to interpret the results of analysis to make decisions and 15 % of students are able to analyze information displayed in the form. In this research, the test instruments used had not been adapted to the components of the AKM questions. Therefore, in this study the researcher will analyze the numeracy literacy skills of junior high school students by using questions similar to the AKM questions and focusing on one of the contents contained in the AKM, namely number content.

Students' abilities in solving questions are grouped into three categories, namely high, medium and low groups. The abilities of students in each group are of course different. In line with research by Rezky et al. (2022) high ability students are able to write solutions coherently and precisely, interpret the questions given, and are able to choose the right solution strategy. Medium ability students can solve problems, but do not meet the maximum indicators. Meanwhile, low ability students have difficulty interpreting questions and linking concepts and do not choose optimal solution strategies.

Therefore, to examine more deeply the numeracy literacy skills of students in solving AKM model questions, especially on number content, researchers will conduct research based on high, medium and low groups.

Thus, from the explanation above, researchers were encouraged to conduct research with the title "Analysis of Numeracy Literacy of Middle School Students in Solving AKM Model Questions on Number Content".

RESEARCH METHODS

Research Design

This research is a type of descriptive qualitative research. This descriptive qualitative research is aimed at describing and illustrating existing phenomena and paying more attention to the characteristics, quality and interrelationships between activities (Sukmadinata, 2016). Qualitative research also emphasizes an in-depth understanding of a problem. The approach used is a case study. The aim of using this case study is to obtain an in-depth picture and understanding of a case (Abdussamad, 2021). It is hoped that this research will be able to provide an overview of junior high school students' numeracy literacy abilities in solving AKM model questions on whole numbers and fractions.

Time and Place of Research

This research was carried out at SMP Negeri 7 Serang City from April to May with the research subjects chosen being class VII-G students in the even semester of the 2023/2024 academic year.

Research Subject

The subjects in this research were students in class VII-G of SMP Negeri 7 Serang City, even semester of the 2023/2024 academic year who had received material on whole numbers and fractions. Serang City 7 Public Middle School was chosen because the school has implemented an independent curriculum so that the Minimum Competency Assessment has of course been implemented at the 8th grade level.

The choice for class VII was made to familiarize students with solving long literacy questions, because the test instrument used was AKM model questions. The selection of research subjects was based on the results of students' AKM model test questions which had been grouped into three groups.

Procedure

1. **Introduction**

   In the preliminary stage, several initial activities are carried out in conducting research, namely determining the topics that will be discussed in the research and reviewing the literature. Where the topic chosen is about the numeracy literacy skills of students at the junior high school level. Next, determine the subject and location of the research. The subjects chosen were class VII students and the research location was in one of the junior high schools in the city of Serang. After that, determine the data collection techniques and data analysis techniques that will be used and coordinate with the mathematics subject teacher regarding the implementation of the research.

2. **Composing Instruments**

   At this stage the researcher prepared the research instruments used, namely test instruments in the form of AKM model questions with number content and non-test instruments. The steps taken were formulating an instrument grid according to numeracy literacy indicators, compiling AKM model questions, creating instrument scoring guidelines, and creating interview guidelines.

   Before creating AKM model questions, a test instrument grid is created first. This grid is in the form of a matrix that contains guidelines for compiling questions into a test. After that, it was continued with making three AKM model questions in the form of essays or

descriptions. Next, scoring guidelines and answer keys for each question that have been created are created.

3. Validating the Instrument

At this stage, what is done is to provide the research instrument sheet that has been created to the validator. The validators chosen were two mathematics experts, consisting of one mathematics lecturer and one mathematics teacher. If the instrument that has been created is invalid, it will be revised and revalidated until the research instrument is declared valid by the validator. However, if the research instrument has been declared valid by two expert validators, it will continue to the next stage.

The research instrument to be used must be tested first to determine its suitability as a data collection tool. Therefore, the research instruments that have been prepared are then tested to determine the validity, reliability, distinguishing power and level of difficulty of the questions.

4. Collecting data

Data collection was carried out using written tests, interviews and documentation methods. A written test was given to research subjects in the form of essay questions related to whole numbers and fractions. Students take the test within the specified test period and then all student answer sheets are collected. Next, an interview was conducted by asking students several questions to dig deeper into their numeracy literacy skills. Apart from that, documentation is also carried out when working on questions and interviews.

5. Analyzing Data

The data analysis stage was carried out after data collection through test, interview and documentation methods. After all the data is collected, the next step is data analysis. This analysis was carried out to describe students' numeracy literacy abilities. The data analysis used in this research is the Miles and Huberman analysis model which consists of three stages, namely data reduction, data display and conclusion (Rahma P & Reflina, 2023).

6. Draw a conclusion

` This stage is the final stage in the research, where the researcher makes conclusions regarding the research that has been carried out regarding the description of students' numeracy literacy abilities in solving AKM model questions based on data analysis carried out in the previous stage.

Research Instruments

1. Written test

The written test used in this research is the AKM model questions on number content. This written test was carried out to determine the extent of students' numeracy literacy abilities in solving AKM model questions based on numeracy literacy indicators. The form of questions given is an essay question or a description of 3 questions regarding the number content in class VII mathematics, namely whole numbers and fractions. The questions created contain 3 cognitive levels, namely understanding, application and reasoning. Furthermore, the context used in test questions is personal, socio-cultural and scientific context.

The test instruments that have been prepared are then validated by mathematicians, namely mathematics lecturers and mathematics teachers. If the test instrument created has been declared valid by the validator, then the next step is to test the questions. The

numeracy literacy test instrument was tested on 38 students in class VII-F. This trial was carried out to determine the validity, reliability, distinguishing power and level of difficulty of the numeracy literacy test instrument. After the test instrument was declared valid and reliable, a written test was then carried out on class VII-G students to determine their numeracy literacy skills in solving AKM model questions.

2. Interview guidelines

The type of interview used in this research is a semi-structured interview. Where the questions asked are adapted to the conditions of the research subject, but remain within the limits set in the interview guide so that implementation is freer. Therefore, the interview guide created only contains the core questions that will be asked to research subjects. This interview was conducted to find out more about students' numeracy literacy skills and to confirm the answers that students had written on the answer sheet. The questions asked to students are based on indicators of numeracy literacy so that researchers can find out more deeply about the numeracy literacy skills possessed by students.

Data Analysis

1. Data reduction

The data obtained from the field is certainly quite large, so it is necessary to analyze the data by reducing the data. Data reduction is the activity of analyzing the data that has been obtained then extracting important information and separating unnecessary information (Arofa, 2022). This data reduction is carried out to summarize and select important data, as well as focus the data according to the research theme. The steps taken at this stage are correcting the completion of the AKM model test questions based on the scoring guidelines that have been created, grouping the results of the AKM model test questions, conducting interviews to obtain deeper information regarding students' cognitive processes when working on the AKM model questions that have been given, conducting analysis of test and interview results to determine students' numeracy literacy abilities in solving AKM model questions. The grouping of students' AKM model test results is based on criteria calculated using the three-level grouping formula according to Azwar (2012).

Table 3.7. Criteria for Grouping Student Test Results

Score Range	Group
$X \geq M + 1SD$	Tall
$M - 1SD < X < M + 1SD$	Currently
$X < M - 1SD$	Low

(Azwar, 2012)

Information:
X : total score obtained by students
m : average value
elementary school : standard deviation

In determining the number of research subjects, there are two conditions that must be met, namely adequacy and suitability (Martha & Kresno, 2016). Therefore, after the AKM model test results were grouped based on the criteria above, purposive sampling was then carried out and two students were selected from each group to be interviewed. Interviews were conducted to obtain more in-depth information regarding students' numeracy literacy abilities and the methods used by students to solve these problems.

2. Data Presentation

After the data obtained has been reduced, the next step is to present the data in the form of tables, graphs, diagrams, and so on. Data presentation is carried out so that the data can be more organized, easy to read, easy to understand and contain interconnected patterns and are easy to understand. In this research, the data is presented in the form of tables and brief narrative descriptions. The data presented is data from students' completion of the AKM model test questions from several students selected as research subjects and data from interviews with selected research subjects.

3. Drawing Conclusions

The final stage in qualitative data analysis is drawing conclusions. Conclusions were drawn after analysis was carried out based on numeracy literacy indicators. The conclusions obtained can be in the form of theories, new findings, or causal relationships. The conclusions drawn in this research were based on the results of data analysis which then produced new descriptive findings regarding the numeracy literacy abilities of class VII students at SMPN 7 Serang City in solving AKM model questions on number content.

RESEARCH RESULTS AND DISCUSSION

Research result

Researchers gave AKM model questions with 3 descriptive questions regarding whole numbers and fractions to 36 students in class VII-G. After students have finished working on the questions, the answer sheets are collected and then corrected and given a score according to the scoring guidelines. Then, based on the test results, students were grouped into three group levels, namely the high group, medium group and low group. The following are the results of the AKM model test questions which have been grouped.

Table 2. AKM Model Question Test Results

No.	Student's name	Total Score	Group
1.	ARP	42	Tall
2.	ASIA	4	Low
3.	ANF	7	Low
4.	ADG	2	Low
5.	A A	24	Currently
6.	ACR	11	Currently
7.	BDR	21	Currently
8.	BDL	26	Currently
9.	BLP	20	Currently
10.	CHOKE	19	Currently
11.	CIF	16	Currently
12.	DAE	14	Currently

No.	Student's name	Total Score	Group
13.	FSY	11	Currently
14.	F.A	41	Tall
15.	FR	18	Currently
16.	CASH	1	Low
17.	KDA	19	Currently
18.	LFR	27	Currently
19.	LAJ	19	Currently
20.	LPG	23	Currently
21.	MAWA	23	Currently
22.	M.F	18	Currently
23.	M.S	22	Currently
24.	MREH	29	Currently
25.	MDS	15	Currently
26.	M.F	25	Currently
27.	MABL	31	Tall
28.	M.F.A	21	Currently
29.	NJR	27	Currently
30.	SSR	18	Currently
31.	RM	21	Currently
32.	R.I	39	Tall
33.	RY	7	Low
34.	SR	27	Currently
35.	SNM	19	Currently
36.	SQA	15	Currently

The results of the AKM model test questions are then analyzed based on numeracy literacy indicators. The first indicator is in question number 1, the second indicator is in question number 2, and the third indicator is in question number 3. The results of scoring the AKM model test questions based on the numeracy literacy indicators are presented in the following table.

Table 4.3. Scoring Results Based on Numeracy Literacy Indicators

No.	Indicator	Ideal Score	Average	Percentage
1.	Able to use various kinds of numbers and symbols related to basic mathematics to solve problems in various contexts of daily life	12	4.44	37.04%
2.	Able to analyze information displayed in various forms	25	13.42	53.67%

No.	Indicator	Ideal Score	Average	Percentage
	(graphs, tables, charts, diagrams, and so on).			
3.	Able to interpret the results of analyzes that have been carried out to predict, formulate and conclude.	27	2.19	8.13%
	Average/Mean			32.94%

Based on the table above, it can be seen that each numeracy literacy indicator has a different ideal value. This is because each question item has a different level of difficulty. Table 4.2 also shows the percentage of students' numeracy literacy abilities in general, namely 32.94%. The highest percentage was in the second indicator at 53.67%, then the second highest percentage was in the first indicator at 37.04% and the lowest percentage was in the third indicator at 8.13%.

Grouping students into 3 group levels is based on criteria which in the calculations use the average value and standard deviation which are presented in the following table.

Table 4.3. Range of Scoring Results for Each Group

Score Range	Group	The number of students	Percentage
$X \geq 29{,}67$	Tall	4	11.11%
$10{,}33 < X < 29{,}67$	Currently	27	75%
$X < 10{,}33$	Low	5	13.89%

Based on the table above, it can be seen that there are 4 students in the high group with a percentage of 11.11%, 27 students in the medium group with a percentage of 75%, and 5 students in the low group with a percentage of 13.89%. Thus, it can be concluded that the students' numeracy literacy test results are predominantly in the medium group.

Discussion

The research subjects selected were 6 students based on grouping criteria, namely 2 students from the high group, 2 students from the medium group, and 2 students from the low group. The following research subjects will be interviewed.

Table 4. Selection of Research Subjects

Name	Code	Score	Group	Criteria
ARP	S-1	42	Tall	Students with the highest scores in the high group
R.I	S-32	39		Students with the lowest scores are in the high group

MREH	S-24	29	Currently	Students with the highest scores are in the medium group
LFR	S-18	27		The student with the second highest score was in the medium group
CASH	S-16	1	Low	Students with the lowest scores are in the low group
RY	S-33	7		Students with the highest scores are in the low group

The answers from the 6 students who were selected as research subjects were then analyzed to describe the numeracy literacy abilities of each group in solving AKM model questions. Then interviews were conducted to confirm the students' answers and dig deeper into the students' numeracy literacy skills.

Based on the results of data analysis carried out in each group, it can be seen the numeracy literacy abilities of class VII students at SMP Negeri 7 Serang City in solving AKM model questions on number content. The numeracy literacy abilities of students in each group category are apparently different. Students have not been able to meet every numeracy literacy indicator used by researchers.

Students with high and moderate numeracy literacy skills are able to use numbers and symbols related to whole numbers to solve problems in a personal context and are able to solve the problem in question number 1 correctly without any errors. Meanwhile, students with low numeracy literacy skills are quite capable of using numbers and symbols related to whole numbers to solve problems in a personal context.

These findings are in line with the research results of Sari & Aini (2022) which stated that students in the high and medium groups were able to use symbols or numbers based on the knowledge they had in solving the problems given and the low group were quite capable of using numbers or symbols related to basic mathematics. in solving contextual problems. Also supported by research by Rezky et al. (2022) that high and moderate mathematical abilities will be able to solve mathematical problems using various symbolic representations.

Students with high and moderate numeracy literacy skills are quite capable of analyzing the information presented in the questions completely. Students are able to state the information obtained from the questions well. Students are also able to state the information they know and ask about from the questions. Students were also correct in determining the solution strategy, but there were calculation errors. This is in line with the research results of Bala et al. (2023) that students with high and moderate abilities make arithmetic operations errors when solving problems.

Students with low numeracy literacy skills are less able to analyze the information presented in the questions completely. Students in this low category are less able to determine the right solution strategy to solve problems. This is in line with the research results of Irawan et al. (2021) stated that students with low ability to solve problems are less able to choose and implement solving strategies and do not recheck the answers they have obtained.

Students with high numeracy literacy skills are quite capable of interpreting the results of analyzes that have been carried out to predict, formulate and conclude. Students

have been able to fulfill this third indicator quite well, but there are calculation errors so that the final answer for potential height in some couples is not quite right. This is supported by research by Silvia & Asdarina (2024) which states that high category students are able to organize solutions correctly, provide explanations for the analysis they have carried out, and provide conclusions on solving problems, only students are mistaken in calculating the final results. The reason is that students are not careful and do it in a hurry and do not check the answers they have received.

Students with moderate numeracy literacy skills are less able to interpret analysis results to predict, formulate and conclude. Students have been able to explain the steps to solve them, but students have not been able to solve the problem correctly so they have not been able to come to a conclusion. In line with research by Purnomo et al. (2022) stated that the factor that caused their research subjects not to write conclusions was because the subjects were unable to complete the calculation process at the previous stage. This is also supported by research by Sari & Aini (2022) which revealed that students in the medium category had determined a solution strategy based on question analysis, but the answers obtained were not correct.

Students with low numeracy literacy skills are less able to interpret analysis results to predict, formulate and conclude. This happens because students do not master the concept. Students do not write down or are inaccurate in writing down the information they know and are asked about so that mistakes at the beginning can result in students making mistakes at a later stage. In line with research by Sari & Aini (2022) which revealed that students with low ability were less successful in mastering a concept so they were unable to solve problems correctly. Also supported by research by Utari et al. (2023) students' lack of understanding in understanding concepts results in students often using formulas incorrectly in solving problems.

There are several reasons why students' numeracy literacy skills are less than optimal, including the ability to understand concepts and reading skills. Numeracy literacy ability and concept understanding ability are related to each other. Understanding mathematical concepts is the basis for being able to learn mathematics in a meaningful way (Nur et al., 2022). Supported by research by Setya & Purnomo (2023) which revealed that students do not lack practice in solving numeracy literacy questions and do not apply mathematical concepts in everyday life. Reading ability caused by the information presented in the questions not being understood and not analyzed first can be one of the causes of less than optimal numeracy literacy abilities, Fauzi et al (2021).

CONCLUSION

Based on the results of data analysis and discussions that have been carried out, it can be concluded that students' numeracy literacy skills in solving AKM model questions are still not good. This is because students in the high, medium and low groups have not been able to meet the three numeracy literacy indicators. It can be seen from the general achievement of students' numeracy literacy skills that it is only 32.94%. The highest percentage was in the second indicator at 53.67% and the second highest percentage was in the first indicator at 37.04% and the lowest percentage was in the third indicator at 8.13%.

Based on the findings obtained in this research, it is hoped that future researchers can analyze students' numeracy literacy skills more deeply in solving AKM model questions with different content. Then, teachers should emphasize students' understanding of concepts in

whole numbers and fractions, especially in the concept of arithmetic operations on whole numbers and fractions so that students can solve the problems given well. Apart from that, teachers should also provide practice with story questions related to real life more often so that they can train students' ability to solve problems and improve students' numeracy literacy skills.

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