

ANALYSIS OF NUMERACY LITERACY ABILITY OF GRADE XII STUDENTS IN SOLVING AKM QUESTIONS ON TRIGONOMETRY

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Article Info

Article History

Received: 15-02-2023

Revised: 01-03-2023

Accepted: 20-03-2023

Keywords

AKM;

Numeracy literacy skills;

Trigonometry

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Abstract

The Indonesian government adopted a new policy for the education system to improve the quality of education. One of the policies implemented is the elimination of the National Examination, which is a tool for assessing student learning outcomes at the end of each level of education against national standards. The National Examination was replaced with a Minimum Competency Assessment (AKM) and Character Survey. AKM focuses on students' abilities in reading and writing or known as literacy and numeracy. Numeracy literacy includes understanding mathematical concepts and the ability to apply these concepts in everyday life. Trigonometry material. This is an important topic in mathematics that involves the relationship between angles and side lengths of a triangle. Therefore, this research was conducted to analyze the numeracy literacy skills of class The research method used is descriptive qualitative research. The research results showed that the numeracy literacy skills of students in the low category were 40%, in the medium category were 47%, and in the high category were 13%.

How to Cite:

Rahmawati, A., Farwati, S., & Muthia, S. N. (2023). Analysis of numeracy literacy ability of grade XII students in solving AKM questions on trigonometry. *Pi-Radian Journal*, 1(1), 45-54.

INTRODUCTION

Numeracy literacy skills are basic skills that are important for everyone in facing mathematical problems in everyday life. In formal education, it is expected that every student has good numeracy literacy skills so that they can gain understanding and skills to solve complex mathematical problems. Learning and understanding mathematics is not only taught in primary and secondary schools, but also in universities. During basic education, students' literacy skills are trained to understand mathematics through learning activities at school. The aim of this activity is to build students' abilities to think

critically, think logically, and understand mathematics. According to Ulfa (2019) society must be able to solve problems in a creative, critical and conceptual way.

Students must master six basic literacies in addition to having creative and critical thinking skills. The aim is to make students more competitive to face the challenges of the 21st century. 1. Reading-Writing Literacy, 2. Numeracy Literacy, 3. Scientific Literacy, 4. Digital Literacy, 5. Financial Literacy, and 6. Cultural and Civic Literacy are the six basic literacies. Thus, mathematics is well suited to modern technological advances. This is due to the fact that mathematics is a very comprehensive field that serves as a basis for technological progress (Maskar & Anderha, 2019).

According to the OECD (2018), supported by the results of the PISA study, students' numeracy skills in Indonesia are still low, ranking 72nd out of 79 test-taking countries. The test results stated that the average student score was 371 in reading, 379 in mathematics, and 396 in science. These scores were below the average of the 79 PISA participating countries, namely 487 for reading ability, and 489 for mathematics and science ability. Therefore, to improve students' numeracy skills, practice questions are needed which are based on the Minimum Competency Assessment (AKM).

AKM is a competency assessment needed to measure students' basic abilities. The aim is to find out the extent of students' abilities in mastering a field or subject. This will get them used to working on and understanding the questions. In addition, students have the opportunity to improve their thinking skills, express their mathematical ideas, and develop the given problems to help them solve the given mathematical problems. According to Ekowati et al., (2019) numeracy ability can be defined as a person's ability to formulate, apply and interpret mathematics in various contexts, including the ability to make mathematical reasoning and use concepts. Numeracy ability also includes a person's ability to carry out mathematical reasoning. Reasoning is a process of analyzing, understanding a statement by manipulating mathematical symbols or language found in everyday life and expressing the statement both orally and in writing (Abidin et al., 2021). Numeracy literacy is very important in the world of education and in the context of everyday life, because it is important for students to develop a deep mathematical understanding and relevant practical skills.

Learning evaluation is an important part of the learning process. However, not all types of reviews can be used to measure how well educational goals are being achieved. With the right measuring tools, it's easy to see how well a school is working. Students and institutions are evaluated at all levels and types of education (A. Sari et al., 2021) In implementing learning evaluations in the world of education, of course there will always be changes. This change raises many pros and cons for those who make it happen.

In 2002-2003, the National Final Examination was used to measure how well students' learning outcomes at each level of education in Indonesia were. However, in 2005, the National Final Examination was changed to the National Examination. Using national test scores as the only way to measure how well a student is doing at school is certainly not a good idea. Based on the results of the assessment of the world of education in Indonesia, the 2015 PISA report shows that students aged 15 years will be tested for their academic abilities. This is a world-class assessment program. Of the 72 participating countries, Indonesia's education system ranks 62nd (Novita et al., 2021). This shows that education

in Indonesia is much worse than in other countries. So, the Ministry of Education and Culture will replace the National Examination with a new program called National Assessment, which will start in 2021.

Evaluation or assessment of the basic competencies needed by all students to develop and participate positively in society is known as Minimum Competency Evaluation (AKM) (Kemdikbud in Ratna Sari, 2021). There are two types of assessment in AKM questions, namely literacy theory and numeracy. Numeracy is the ability to think using concepts, facts, procedures and mathematical tools to solve everyday problems in various relevant situations. According to Maulidina (Hartatik 2019) Students who are proficient in mathematics can analyze information in the form of graphs, tables, charts and others and use this information to solve mathematical problems. They can also use various kinds of numbers or symbols related to basic mathematics to solve mathematical problems. Trigonometry is a mathematical material that is still considered difficult by most students, because in this trigonometry material there are many variations of formulas and concepts that are difficult to understand so that students find it difficult to understand this material which results in students feeling difficult when working on the questions. related to trigonometry (Nurfauziah & Sari, 2018).

Based on findings at one of the private vocational schools in Bandung City, we found that there were several problems. Students are skilled at solving problems with the help of their notebooks, but they are not yet skilled at completing assignments by themselves. Apart from that, students are not confident in working on questions, they are doubtful about the results of their work. Regarding AKM questions, quite a few students are still not used to AKM questions, especially since they only do AKM questions when they do ANBK. Not a few students find it difficult with the AKM questions. Besides that, they have not yet fully mastered their numeracy literacy skills, because they are not used to such questions and questions. This can be seen from students who work on questions carelessly and only do it to the best of their ability. Some students admitted that it was rare to solve problems like this.

Moreover, numeracy literacy skills are really needed in the 21st century. This ability is very closely related to everyday life. The AKM questions on Geometry and Measurement content contain many mathematical concepts that can foster logical, critical and selective thinking skills. One of the Geometry and Measurement content materials contained in the AKM Questions is trigonometry material. At the vocational school level, one of the materials students' studies is trigonometry. This is a branch of mathematics that deals with triangle angles and trigonometric functions such as sine, cosine, and tangent (Kariadinata, 2018). Numeracy literacy skills are really needed by students to adapt to the 21st century. Because of this, researchers want to conduct research regarding numeracy literacy skills in class XII students at private vocational schools in Bandung City in solving Minimum Competition Assessment (AKM) questions on the subject of Trigonometry.

METHOD

The method used is descriptive qualitative research. The research was conducted to analyze the numeracy literacy skills of class XII students at one of the private vocational schools in Bandung City. The data sources in this research were taken from primary and secondary data sources. Primary data sources were taken using interview techniques,

observation, and AKM test questions for students adopted from the AKM book. Secondary data sources were taken using documentation study techniques on student learning activities in working on AKM questions. The instruments used are: 1) 5 AKM questions on trigonometry material adopted from the 2020 edition of the AKM Level 5 and 6 Question Bank book, 2) Questions prepared according to the problem formula and submitted to mathematics teachers and class XII students are referred to as interview guidelines. 3) The observation sheet consists of items or an outline of the observations that will be made and used to assess students' literacy and numeracy skills. 4) Documentation studies are used to collect data and collect important documents and notes related to students' literacy and numeracy skills.

Researchers used semi-structured interviews to collect information about students' cognitive processes, such as understanding, thinking, and application. This research uses a qualitative approach to data analysis. Data analysis was carried out after the results of the numeracy ability test and interviews had been collected. Data analysis is carried out so that the information collected can be read and understood easily. In the data collection stage of this research, data collection was carried out twice. First, the researcher gave AKM questions to students. Second, researchers conducted interviews with teachers and students. 15 students were given a numeracy literacy ability test in solving AKM questions. The time to complete the AKM questions is 30 minutes with 5 questions, in accordance with the comparison time for completing the AKM in the National High School Assessment, which is 90 minutes with 36 questions.

Next, the researchers shared the results of the students' numeracy ability tests. The results are then corrected and evaluated, and students are put into three levels of numeracy ability: low, medium, and high. The following is a categorization table for student test results.

Table 1. Categorization of Student Test Results

Categorization	Interpretation
$X < M - 1SD$	Low
$M - 1SD \leq X < M + 1SD$	Currently
$M + 1SD \leq X$	Height

Information:

M = Mean

SD = Standard Deviation

Source: Book (Azwar, 2012)

The data is then presented to provide information and facilitate understanding. Numeracy literacy skills are discussed in the presentation of this research data. SMK students from each category complete the AKM questions based on the following indicators.

Table 2. Problem Solving Indicators

Cognitive processes	Problem Solving Indicators	Description
Understanding	Identify and formulate problems	Students are able to determine and explain information or material related to AKM questions clearly and precisely

Application	Determine solutions and evaluate problem solving	Students are able to provide solutions to AKM questions correctly
Reasoning	Analyze the problem	Students are able to analyze and solve AKM questions with appropriate reasons

Source: (Argusni & Sylvia, 2019).

RESULTS AND DISCUSSION

Analysis of numeracy literacy skills consists of three contents, namely content, cognitive processes, and context. The results of this research were followed by 15 students who took the AKM test, which consisted of five questions including four multiple choice questions and one description question. The percentage results of the AKM test taken by 15 students are presented in the pie chart below:

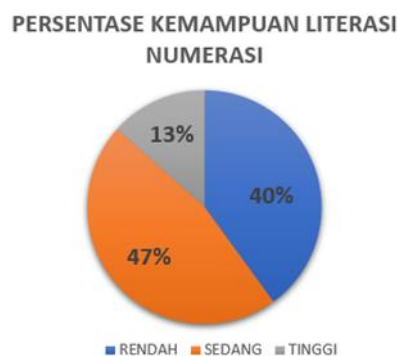


Figure 1. Percentage of students' achievement of numeracy literacy skills

Based on the circle diagram above, the researcher selected three students with low, medium, and high numeracy literacy skills to be interviewed. The percentage results of the AKM test show 40%, 47%, and 13%. The following AKM test result data.

Table 3. Student achievement results from the AKM test instrument

Interval	Percentage (%)	Category
0 - 21	40%	Low
22 - 67	47%	Currently
68 - 100	13%	Height
Total	100%	

From table 1 it can be seen that 6 students (40%) have a low level of numeracy literacy, 7 students (47%) have a medium level of numeracy literacy, and 2 students (13%) have a high level of numeracy literacy. Based on the table of results from the AKM question test instrument, it can be concluded that the numeracy literacy ability level of class XII students is included in the medium level.

Results of analysis of students with low numeracy literacy skills, when interviews were conducted with students who had low numeracy literacy skills, they were unable to understand the form of the questions and how to do them so they had difficulty working

on the AKM questions. Students said that the questions given by researchers had too many narratives that had to be read and understood, making them run out of time to work on them. Question number one shows a picture of a child standing in front of a flagpole and forming a triangular shadow. The child wants to measure the length of the flagpole's shadow. This is an easy level question.

The interview results showed that students who had low numeracy literacy skills were unable to obtain information from the stimuli provided. Question number 1 can be determined easily by using trigonometric ratios correctly, which was done by four of the six students who had low numeracy skills. Question number 3 is a medium level question involving text that explains several types of truss bridges. Based on the results of interviews with students with low numeracy literacy skills, these students had difficulty analyzing and solving questions and students lacked time to complete them. However, of the six students who had low numeracy literacy skills, two students were able to solve the questions correctly.

Question number four is a difficult question because the question contains descriptions and illustrations. Students are asked to assess whether the scout students can measure the width of the river using the sketch in the picture. Students who have poor numeracy literacy are unable to understand information from reading clearly and precisely. As a result, they cannot do the questions they have well given. Results of interviews with students who have numeracy literacy skills Low indicates that students have difficulty understanding the problem and providing solutions. Students stated that the AKM questions required too much reading, they were unable to determine the concept or mathematical formula to be used, and they lacked time to work on the questions. However, one in six students who have low numeracy literacy skills experience difficulties. This is in line with research results (Sari et al., 2021) where students with low numeracy literacy skills have difficulty answering descriptive questions because they do not understand the content of the questions, some of the questions presented are things that students have not learned at school.

Next, the results of analysis of students with moderate numeracy literacy skills, students with moderate numeracy literacy skills already know several types of AKM questions during interviews, so the task is not too difficult for them. In addition, students said in this interview that the context of the questions which were closely related to everyday life made them easier to understand. Each type of question has a different level of difficulty. Students with numeracy literacy skills face problems with AKM, namely lack of time to complete it. It is very important when working on essay questions. therefore, students can only perform tasks according to their abilities.

Question number one shows a picture of a child standing in the middle and a flagpole that forms a triangular shadow. This is an easy level question. The interview results showed that students with moderate numeracy literacy skills were able to capture information from the stimuli provided. However, of the 7 students who had moderate numeracy skills, six of them could easily answer question number 1 about how high the flagpole is using trigonometric ratios correctly. Question number 3 is of medium level and requires text that explains several types of truss bridges.

Based on the results of interviews with students with moderate numeracy literacy skills, these students were able to analyze and solve question number 3 on the grounds that this question required time and students with low numeracy literacy skills experienced a lack of time given. However, 4 out of 7 students with moderate numeracy literacy skills were able to answer the question correctly. Question number 4 is a difficult level question by presenting a descriptive question accompanied by an image. Students are asked to analyze whether by using the sketch in the picture, scout students can measure the width of the river? In this difficult level question, students with moderate numeracy literacy skills are not able to determine the information from the reading clearly and precisely so that students are not able to understand the questions and do the questions that have been given well.

The interview results show that students who have numeracy literacy skills are experiencing difficulties in understanding and solving problems. Students stated that they had several problems with the AKM questions: too much reading, they cannot memorize mathematical concepts or formulas to be used, and lack time to solve problems. However, out of seven students who have numeracy literacy skills, two can answer the question correctly. This is in line with research results (Rahmawati, 2021) that students with moderate numeracy literacy skills already understand the meaning of the questions given. However, the problem-solving strategy chosen by students is still not appropriate and the questions given are confusing because they have quite a long reading. As well as the problem of lack of time in working on questions.

Results of analysis of students with high numeracy literacy skills, Students who have good numeracy literacy skills already know the types of AKM questions during interviews, so the task is not too difficult for them. Apart from that, students said in the interview that the context of this question was easy to understand because it was adapted to everyday life. Students who have high numeracy literacy skills do not lack time to work on this AKM. Question number one shows a picture of a child standing in the middle and a flagpole that forms a triangular shadow. This is an easy level question.

The interview results show that students who have high numeracy literacy skills are able to capture information from the stimuli provided. Two students who have high numeracy literacy skills can answer question number 1 about how high a flagpole is using the correct trigonometric ratios. Question number 3 is of medium level and requires text that explains several types of truss bridges. The interview results showed that students with high numeracy literacy skills were able to analyze and solve question number 3 in a timely manner, and that two students with high numeracy literacy skills were able to provide the correct answer to this question.

Question number four is a difficult level question that involves descriptions and illustrations. Students are asked to assess whether the scouts can measure the width of the river using the sketch in the picture. Students who have numeracy literacy skills are not able to determine information from reading clearly and precisely. As a result, they cannot understand and do the questions that have been given well. The interview results show that students have numeracy literacy skills experienced difficulty in solving questions.

Students stated that the AKM questions were read too much, they were unable to memorize mathematical concepts or formulas that will be used, and they experience a lack of time to complete the questions. However, one in two students with the ability high numeracy literacy can answer the question correctly. Students are used to memorizing something without understanding the concept, students tend to have difficulty understanding the question (Yulfiana & Sumardi, 2016). To improve students' numeracy literacy, teachers can help them, remind them of mathematical ideas, and practice story questions.

These exercises can also help students strengthen their abilities in understanding, application, and numeracy reasoning, as well as prepare them for the upcoming AKM exam. In line with this, according to Astuti (2015), conceptual understanding is a student's ability to master material apart from remembering or knowing certain concepts. They are able to interpret data, rephrase it in different ways, and apply concepts according to their cognitive structure. Teachers can help improve students' numeracy literacy skills by increasing their practice with more weighty story questions. This will train students' numeracy literacy skills in understanding, application and reasoning, as well as prepare students for the upcoming AKM questions.

CONCLUSION

Based on the research that has been carried out, the researchers concluded that students can solve AKM questions quite well. The results of this research through the AKM question test aimed at class XII students at one of the Vocational Schools in Bandung City show results of 6 students have a low numeracy literacy ability level, as many as 7 students have a moderate level of numeracy literacy, and as many as 2 students have a high level of numeracy literacy. Based on the table of results from the AKM question test instrument, it can be concluded that the numeracy literacy ability level of class XII students is included in the medium level. The focus of the research is numeracy literacy skills. The interview results show that students with low numeracy literacy skills do not yet know the forms of AKM questions and how to do them. Meanwhile, students with moderate numeracy literacy skills mostly know the forms of AKM questions, but they face difficulties in completing them in the time given. When doing assignments, students run out of time and have difficulty determining information from reading clearly and precisely. As a result, students cannot understand and work on the questions that have been given well. Most students who have high numeracy literacy skills already know the form of AKM questions and are able to solve them on time with the right answers. The results of the research show that class. Researchers suggest that for this school, socialization regarding the Minimum Competency Assessment is held for both teachers and student. Hopefully for next time teachers to become more familiar with it provide questions based AKM numeracy literacy for students so that students more accustomed to working on AKM questions and ready to solve the questions accurately. Suggestions for further researchers to conduct experimental research by finding the right learning model to overcome numeracy literacy problems.

ACKNOWLEDGMENTS

The author would like to express his thanks to the mathematics teacher at one of the private vocational schools in Bandung City who has provided maximum contribution to the completion of this research.

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