Literacy, Numeracy, and Scientific Literacy Levels for Junior High School Students in Banjarmasin

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ARTICLE INFO

Keywords:
Literacy, numeracy, literacy science

ABSTRACT

Achievements Participant students in literacy, numeracy, and science in Indonesia are in the bottom 10 countries based on the 2018 PISA survey. Through the Ministry of Education and Culture in the independent curriculum, the government has improved self-capacity development stimulation services for students with the Minimum Competency Assessment (AKM). AKM focuses on highlighting literacy and numeracy competencies in depth. On the other hand, even though it is not included in the main focus of the independent curriculum, scientific literacy is considered one of the main requirements for forming a democratic society. This can be seen from the OECD's particular interest in scientific literacy. The importance of literacy, numeracy, and scientific literacy for students underlies this research to determine junior high school students' literacy, numeracy, and scientific literacy levels in Banjarmaisn. This type of research is descriptive quantitative. Data collection is done by testing and documentation. The results showed that the literacy level of junior high school students in Banjarmasin was at the "basic" level with an average mastery of 35.4%, numeracy at the "basic" level with an average mastery rate of 29.9%, and scientific literacy at the "basic" level. Low" with an average passing rate of 48.8%. Literacy, numeracy, and scientific literacy are essential for students, so there is a need for relevant strategies to improve students' literacy, numeracy, and scientific literacy competencies.

1. INTRODUCTION

Indonesian students' achievements in literacy, mathematics, and science are issues that must be addressed. Based on a survey by PISA released by the OECD in 2018 [1], Indonesia is ranked in the lowest ten countries with low literacy levels. Apart from the low ranking, what needs to be remembered is that most junior high school-age students in Indonesia have an impressive ability to remember information but still have weaknesses in analyzing and using concepts to solve problems [2]. Students' literacy ability is limited, reflected when they respond to information without in-depth reflection, and when a slightly more complex question is asked, they will experience difficulties providing an answer [3]. Students are proficient in calculation problems but cannot solve problems by formulating, applying, and, even more so, interpreting mathematics in various contexts [4].

Referring information recorded by the Central Statistics Agency (BPS) in 2022 shows that Indonesia's Literacy Rate (AMA) is 98.49%. This means that 98.49% of the Indonesian population aged 15 can read, write and do simple math, and 1.51% are still illiterate. The percentage of illiterates seems small, but when multiplied by the total population of Indonesia, which reaches 273.5 million people, you get a sizeable quantitative number. It is a shame that the Indonesian people's ability to understand the context and content of texts is still experiencing difficulties, especially when asked to answer questions from the text they read.[5].

The Indonesian government has promoted literacy programs through regulations issued by the Ministry of Education and Culture in Permendikbud number 23 of 2015 regarding "Building Characteristics (PBP)." In October 2017, the Government of Indonesia, through the Ministry of Education and Culture, launched the School Literacy Movement (GLS), followed by the launch of the

National Literacy Movement (GLN) [6]. In the 2015 World Economic Forum report entitled "New Vision for Education: Development of Social and Emotional Learning Technology," it was revealed that in the 21st-century era, the skills that hold a vital role involve the ability to master the basics literacy, namely how to practice ability major in the situation routine. There are six elements in this basic literacy framework, namely: literacy literacy, financial literacy, digital literacy, cultural literacy, numeracy literacy, and scientific literacy. [7].

Two of the six basic literacy competencies in the independent curriculum are the leading focus indicators of learning success, namely reading literacy and numeracy. The Minimum Competency Assessment (AKM) measures the essential literacy competencies needed for success in various subjects. Unlike evaluations focusing on specific subjects, AKM highlights literacy and numeracy competencies in depth, not just mastering content [8].

The abilities evaluated in reading literacy and numeracy in AKM include thinking logically and systematically, thinking critically by utilizing previously acquired concepts and knowledge and analyzing and processing information/data. AKM presents various situations with different backgrounds, and it is hoped that students can solve these problems using literacy and numeracy skills. By utilizing the results of the AKM, teachers can get the right view to apply the "teaching at the appropriate level" view [9].

The Ministry of Education and Culture [10] released a definition of literacy referring to the International Literacy Association (ILA). This definition describes literacy as the ability to recognize, understand, interpret, create, process data, and communicate through visual, auditory, and digital symbols related to various fields of knowledge. This definition emphasizes that literacy must accommodate two main elements: text and thinking skills. Literacy proficiency is stated as one of the parameters for measuring the achievements of the Education unit in the Education report card. Literacy proficiency assessment in the Education report card is obtained by implementing the Minimum Competency Assessment (AKM) [11].

Numeration differs from math competency, even though both share a similar foundation of knowledge and skills. The fundamental difference lies in applying knowledge and skills, where numeracy skills are broader than mathematical abilities. Numerical skills involve the application of mathematical concepts and rules in real-life situations, which often have varying levels of complexity, and various solutions, some of which cannot be solved completely, and are related to non-mathematical factors. It should be noted that numeracy requires an understanding of mathematics obtained from the curriculum. However, it cannot be guaranteed that learning mathematics alone will automatically develop numeracy skills [12].

On the other hand, although not included in the main focus of the independent curriculum, scientific literacy is considered one of the main requirements for forming a democratic society. Sengul (2019)stated that the science skills individuals possess can have an impact in the context of everyday life, where they are actively involved in their responsibilities as members of society responsible for adopting a democratic attitude. [13] also, scientific literacy and discourse enable individuals to participate in controversial science issues through a critical attitude towards society and an understanding of social values. This can be seen from the OECD's particular interest in scientific literacy in addition to literacy, financial literacy, digital literacy, cultural literacy, and also numeracy.

The OECD describes the notion of scientific literacy as an individual's ability to apply scientific knowledge in real-world situations. Therefore, developing scientific literacy in every learner is an urgent need so that they can find optimal solutions to scientific challenges faced in their surroundings [14]. Scientific literacy focuses on developing students' knowledge of meaningful scientific concepts, thinking critically, and making the right decisions regarding real-world problems. Given the vital value of scientific literacy, the main goal of any change in science learning is to educate the public to have scientific literacy. However, it is still common to find that science learning methods often ignore social aspects of the learning process [15].

Previous research conducted in Indonesia, which is similar to this research, is generally related to literacy, which is still in the form of general descriptions [16], related to how to increase numeracy in certain sub-chapters [17] and about increasing scientific literacy in certain sub-chapters, but not in the

form of a follow-up study on a portrait of the condition current literacy, numeracy, and scientific literacy in a learning environment. Even though education practitioners in Indonesia need to understand the actual situation in their work environment to know the actual conditions.

Literacy, numeracy, and scientific literacy as part of basic literacy as essential skills in the 21st century also support improving the quality of education. Therefore, considering the previously described context, the researcher is interested in carrying out a study entitled Levels of Literacy, Numeracy, and Scientific Literacy of Junior High School Students in Banjarmasin. This study aimed to determine junior high school students' literacy, numeracy, and scientific literacy levels in Banjarmasin.

2. METHODS

The type of research adopted in this research is descriptive quantitative. This research was conducted at one of the Public Middle Schools in Banjarmasin. The researcher chose a junior high school in Banjarmasin as the research location due to time constraints in the study, considering the ease of access to the school. However, to compensate for this, the researcher included all seventh-grade students at the junior high school as participants in this study. This study used a convenience sampling technique. This study used a sample of 146 students of class VII JUNIOR HIGH SCHOOL in Banjarmasin.

Table 1. Instrument indicators for measuring literacy, numeracy, and scientific literacy

Literacy Indicator		**N Items**
Find information	Perform access and excavation information in discourse, narrative, or tables chart.	7
Interpret and integrate	Own understanding of express and implied information, combining understanding from various parts of a text to generate conclusions based on interpretation.	5
Evaluate and reflect	We are assessing the credibility, suitability, or validity of texts or quotations and being able to relate text content to context outside of text or quotations.	3
Numeration Indicator		N Items
understanding	Understand facts, procedures, and mathematical tools (numbers and mathematical symbols)	10
Application	Able to apply mathematical concepts to real situations that are routine	5
reasoning	Reason with mathematical concepts to find solutions in unusual problem situations	5
Science Literacy Indicator		N Items
Explain phenomena scientifically	1) Remember and apply scientific knowledge 2) Identify and model explanation and representation 3) Create and validate the accurate estimate 4) Propose a clear hypothesis 5) Decipher the possible impact of knowledge science on society	8
Evaluating and designing scientific investigations	1) Identify the questions explored in a scientific study 2) identify worthy questions used for doing an investigation 3) Propose ways of exploring questions 4) Evaluate how to explore questions 5) Explain and evaluate to ensure data constraints and objectivity, generalizability	6

Interpret scientific data and evidence.	1) Transforming data from one representation to another 2) Analyze and interpret data and retrieve accurate conclusion 3) Identify assumptions, evidence, and reasoning in related science texts 4) Distinguish between arguments based on scientific facts and theories based on other considerations 5) Evaluate scientific rationale and evidence from a variety of sources.	6

Data collection techniques in this research use tests and documentation. The test is used to observe each student's literacy, numeracy, and science literacy. The form of the test used is a multiple-choice test instrument. Each test instrument is provided in paper format and answered in writing, then can be graded electronically through the ZipGrade application. The documentation used in the research is data on the students' literacy scores, numeracy scores, and science literacy scores.

The data obtained from the research were processed using quantitative descriptive analysis techniques. Quantitative data from literacy, numeracy, and scientific literacy test questions will be evaluated as percentages. The percentage of completeness is calculated by calculating the correct answers compared to the total score. Based on the percentage of completeness, four levels for literacy and numeracy are obtained, which refer to the Minimum Competency Assessment (AKM), and three levels for scientific literacy which refer to the 2015 PISA assessment framework, can be seen in Table 2 and Table 3 which are listed below.

Table 2. Criteria for students' literacy competency level based on the AKM reference

Completeness percentage	Level
<26%	Need Special Intervention
26%-50%	Base
51%-80%	Competent
81%-100%	proficient

Table 3. The scientific literacy level of students based on the 2015 PISA framework

Completeness percentage	Level
<51%	Low
51%-80%	Currently
81%-100%	Tall

After getting the data analysis in percentage terms to get an overview, it is converted into qualitative data according to the competency level of literacy, numeracy, and scientific literacy based on the percentages obtained. This qualitative data will be described and grouped to produce a conclusion.

3. RESULTS AND DISCUSSION

The research results follow the literacy, numeracy, and scientific literacy test instruments used during the research. Several findings show students' literacy, numeracy, and scientific literacy levels and are described based on percentage (quantitative) levels.

Literacy

Table 4. Percentage of Student Literacy Levels

Competence	Percentage Learners	Level
Find information	38%	Base
Interpret and integrate	30%	Base
Evaluate and reflect	40%	Base
Literacy (overall)	33.9%	Base

These results provide an overview of the achievements of the literacy competency level as well as deficiencies that need to be supported for progress. If this is allowed, Indonesian students are threatened with not reaching the ideal ability to be involved as citizens who participate actively and positively in the future. This indicates the need for a crucial change oriented toward increasing student literacy in schools.

Several dimensions can be used as benchmarks to advance the knowledge and literacy of junior high school students in Banjarmasin, including; access dimensions, alternative dimensions, and cultural dimensions. The access dimension needs to be considered by schools by increasing the number of best-selling books that are currently booming in society, both fiction and non-fiction. An alternative dimension the school can consider is providing electronic and digital devices, such as a wifi corner, to access information. The school can grow the cultural dimension to increase the percentage of students' literacy by providing opportunities for all students to display their works in the classroom area and school corridors and be replaced regularly. In addition, during celebrations at school, schools can organize book festivals, review writing competitions, poster competitions, and so on so that throughout the year, literacy can color all important celebrations at school and continue to become a school culture.

Numeration

Table 5. Percentage of Students' Numeral Levels

Competence	Percentage Learners	Level
understanding	39%	Base
Application	22%	Need Special Intervention
reasoning	34%	Base
Numeration (overall)	29.9%	Base

Examining the findings above reveals a rich picture of potential improvements to the numeracy skills of junior high school students in Banjarmasin. Numeration is believed to be able to bring students into a society that actively contributes and participates in increasing their chances of success in the world of work and helps deal with everyday problems during an era of rapid technological developments.

Numeracy and literacy are the best protection for the progress of a nation from being left behind in an age when information can spread easily and quickly. The world of education, including learning in schools, also faces challenges from these changes. A nation that is unable to adapt will bring its country behind. What is more, the data above shows that numeration scores are at the "basic" level. At this time, strong numeracy becomes protection in competing with other nations. For this reason, it is vital to carry out strategies so that students' numeracy competencies increase.

Teachers can adapt strategies to the characteristics and needs of students in their schools. Strategies that can help improve student numeracy include using an interactive learning approach, connecting numeracy concepts with everyday life situations, using educational technology, guiding students who need particular interventions and encouraging proficient students (differential learning), organizing/ involving proficient students in math competitions, focusing on the context of problem-solving, emphasizing the basic concepts prior to more complex ones, carrying out collaborative projects, demonstrating the application of numeracy in other branches of science, and using a variety of teaching

materials. A combination of good strategies and continuous support will help students develop strong numeracy competencies.

Science Literacy

Table 6. Percentage of Students' Scientific Literacy Level

Competence	Percentage Learners	Level
Explain phenomena scientifically	52%	Currently
Evaluate and design scientific investigations	36%	Low
Interpret data and evidence scientifically	49%	Low
Scientific literacy (overall)	48.8%	Low

This result reflects that the ability of most students has a solid basis for explaining the phenomena that occur around them, but there is still room for improvement. What is more, when we highlight two scientific literacy competencies of other students who are still at a 'low' level. This indicates a gap in scientific literacy competence among junior high school students in Banjarmasin.

In order to prepare a generation that is competent and full of insight, scientific literacy has a vital urgency in shaping democratic life in an era of rapid technological development. Scientific literacy helps students develop scientific literacy competencies in assessing the validity of information and data. Students with scientific competence can objectively assess arguments and policies, avoid manipulation of information, and make better decisions in a democratic context.

Scientific literacy gives students a deeper understanding of scientific issues related to the environment, health, technology, and others. Students who have scientific literacy competencies tend to have a more balanced view of the positive and negative impacts of technological innovation. Understanding various scientific and cultural views can encourage students to respect and understand different perspectives, which are fundamental values in a democratic society.

Developing scientific literacy among junior high school students can be done by considering the global dimension, in line with the context of science education, and delivering material defined in the curriculum. Teachers can integrate specific strategies into the science learning system to ensure students develop solid scientific literacy. Strategies to increase scientific literacy include active and collaborative learning, wise use of technology, stimulation of interest and involvement, skills in evaluating scientific information, developing media literacy, ethnoscience-based research projects, and encouraging participation in scientific activities.

4. CONCLUSION

Literacy-level participant JUNIOR HIGH SCHOOL students in Banjarmasin are included in the "basic" level with an average completeness of 35.4%. Student numeration is included in the "basic" level with an average completeness rate of 29.9%. Students' scientific literacy is at a "low" level, with an average completeness rate of 48.8%. These results reflect real challenges in junior high school education in Banjarmasin. The government, educational institutions, teachers, and parents must collaborate to overcome this problem.

It is essential to understand that literacy, numeracy, and scientific literacy are the foundations to encourage critical thinking, active participation in society, and evidence-based decision-making. Therefore, improvements in these three areas will not only improve the quality of education but will also help form a generation that is more skilled, knowledgeable, and able to face complex challenges in a constantly evolving world by always innovating.

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