Research Article

Students' numerical ability on minimum competency assessment in junior high school

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ABSTRACT

The aim of this study was to describe the numeracy abilities of junior high school students in Bengkulu City in solving math problems based on minimum competency assessment questions. The results of this study for the long term can be used to prepare students' abilities to face the minimum competency assessment test. The research method used is survey research with a qualitative descriptive approach. The population in this study were all Class VIII students from the State and Private junior high schools of Bengkulu City, namely 40 schools. Sample selection was done in two stages: stratified random sampling and simple random sampling. The research sample consisted of 8 junior high schools in Bengkulu City that met the sample criteria. Data was collected using the minimum competency assessment level 4 math test instrument with 8 items based on the minimum competency assessment grid. Data analysis was carried out with descriptive statistics to describe students' abilities, and prediction tests were conducted using regression tests to describe students' readiness to take the minimum competency assessment test. The results of the study based on the material aspect showed that: (1) students' mastery of number material was 54.47%, (2) algebraic material mastery was 46.44%, (3) students' mastery of geometry material was 33.15%, and (4) material data and opportunities of 18.81%. The analysis results of the level of student knowledge about implementing minimum competency assessment are, on average, in the less category with a percentage of 48.42%. Based on the results of the study, it is recommended that there be the socialization of the application of minimum competency assessment to teachers and students as well as the preparation of special questions so that students are accustomed to solving minimum competency assessment-based questions.

Keywords: survey research; minimum competency assessment; numerical ability

1. INTRODUCTION

The results of the mathematics literacy of high school students in Indonesia based on the Program for International Student Assessment (PISA) survey are in a low category. These results must be a concern for every school in preparing their students. In the 2018 PISA results, Indonesia scored 379 out of an OECD average score of 489 (OECD, 2021; Puspendik Kemendikbud, 2019). Analysis of the results of the 2018 PISA survey of Indonesian students showed that they reached only 1% at levels 5 and 6 of the OECD average of 11%, while 28% were between levels 2-4 of the OECD average of 76%, the rest were below level 2 (OECD, 2019). In addition, the Trends International Mathematics and Science Study (TIMSS) survey shows that Indonesian students' mastery of mathematics is in a low category. In 2012 the average score in mathematics was 375, and it increased by 386 in 2015 and 2018, with a score of 379 out of a maximum score of 600 (Martin et al., 2012; Hadi & Novaliyosi, 2018).

One of the skills emphasized in PISA and TIMSS is mathematical literacy (numbering). Mathematical literacy refers to the ability to select and apply knowledge gained from understanding real situations involving mathematics (Sumirattana, Makanong, & Thipkong, 2017). So it is necessary to emphasize real problems in learning. In facilitating students' literacy skills, the government's efforts are to implement a minimum competency assessment test minimum competency assessment. It is necessary to maximize socialization to prepare schools for the test implementation in implementing minimum competency assessment. The results of an interview with one of the junior high school teachers in Bengkulu City showed that the school needed to prepare for the minimum competency assessment test specifically. There has not been much training related to preparing minimum competency assessment-based questions.

Minimum competency assessment aims to assess the essential competencies needed by all students to develop self-ability and play an active role in society in activities that have positive values in everyday life (Kemendikbud, 2020). One of the focuses of evaluation on minimum competency assessment is numeracy or mathematical literacy. Students can use numerical abilities as capital for mastering other subjects (Nehru, 2019). So it is important to be prepared for students

at every level. This program is implemented to obtain information to improve the quality and quantity of learning, including learning outcomes, learning programs, school climate, and school policies. Minimum competency assessment is a substitute for the national exam system and a form of independent learning policy initiated by the Minister of Education and culture in 2019. Numerical content in the minimum competency assessment consists of numbers, geometry, measurement data, algebra, data, and so on (Ayuningtyas & Sukriyah, 2020). The components of the minimum competency assessment measurement are shown in the following (Kemendikbud, 2020).

a. Content: numbers, geometry and measurement, algebra, data, and probability.
b. Context (a) personal: related to personal self-interest, (b) socio-cultural: related to interests between individuals, culture, and social issues, (c) scientific: related to issues, activities, and scientific facts that have been done or futuristic.
c. Knowledge level: (a) Understanding: understanding mathematical facts, procedures, and tools, (b) Application, being able to apply mathematical concepts in real situations that are routine, (c) reasoning, reasoning with mathematical concepts to solve problems.

Based on this, it is necessary to research to measure the numeracy skills of junior high school students in solving minimum competency assessment questions and predict students' readiness to take the minimum competency assessment test. Several similar studies have been carried out by researchers and other researchers related to students' ability to complete international survey-based tests. The study's results (Susanta, Susanto, & Maizora, 2021) showed that the ability of Bengkulu Junior High School students to solve TIMSS-based questions at the reasoning level was around 58.33% of students in the low category and only 8.33% in the high category. Research (Haji, Yumiati & Zamzaili, 2017) shows that the ability of students to solve PISA questions at SMP Kota Bengkulu with a high level is 59.39%, a medium level school is 43.75%, and a low-level school is 28.01%. Based on these findings, in general, the ability of students, especially secondary schools in Bengkulu City, to solve problems based on international standards is still in the low category. Therefore, in carrying out the minimum competency assessment test, different research needs to be conducted, especially to survey students' abilities and predict the extent to which students are ready to take the minimum competency assessment test. A similar study was conducted by Susanto, Susanta, & Rusdi (2022) regarding the ability of students to solve PISA questions; it was found that students' abilities were at a low level.

The application of minimum competency assessment needs to be a concern, and several studies have been conducted on the minimum competency assessment test. The findings of research conducted by Meriana & Murniarti (2021) showed that teachers still use a standard learning framework by providing assessments that are limited to testing memory. This finding indicates that it still needs to be improved in terms of student readiness because the limited scope of questions given only on memory cannot train students to think higher. The results of a similar study conducted by Cahyanovianty & Wahidin (2021) showed that the numeracy skills of students were more dominant at the moderate level, with a percentage of 75%. The results of this research study indicate that it is necessary to predict student readiness in taking the minimum competency assessment test, especially for Bengkulu City Junior High School students.

2. RESEARCH METHOD

2.1 Type of Research

This study was research with a survey method. Survey research involves a group of individuals answering several questions on an instrument (Fraenkel, 2012). This study aims to describe the numeracy skills of SMP/MTs students in Bengkulu City in solving math problems based on a minimum competency assessment (minimum competency assessment). The quantitative approach is descriptive quantitative, describing the level of numeracy skills of SMP/MTs students and students' knowledge of implementing minimum competency assessment in middle schools in Bengkulu City. The research was conducted at SMP/MTs Bengkulu City with a data collection time of three months, namely July-September 2022.

2.2 Population and Sample

The population in this study were students of Class VIII SMP/MTs Bengkulu City. The selection of class VIII is based on class criteria in the implementation of AKM, namely level 4 (class VIII). The population in this study were all SMP/MTs in Bengkulu City. Data for SMP/MTs schools in Bengkulu City is based on data from the Ministry of Education and Culture (2022) and the Ministry of Religion (2022) that there are 43 SMPs and 8 MTs.

This study is survey research, so the results described must describe the population as a whole. In this case, it is necessary to use a sampling technique so that the sample is representative of the entire population. In determining the sample, the research was carried out in two techniques. (1) Stratified random sampling technique where the determination considers the strata. According to Ruseffendi (2010), sample selection by strata method is carried out if, other than randomly selected members, we want the groups in the sample to be represented, such as the representation of the groups in the population, and the representation must be proportional or comparable. (2) The technique of simple random sampling is chosen randomly. The sample selection stage is as follows.

a.   Grouping schools based on Public and Private Junior High Scools in Bengkulu
b.   Sort each group based on school accreditation data
c.   Choose randomly based on the proportion and group of school accreditation

The results of selecting research samples based on the population distribution are shown in **Table 1.**

Table 1. Selection of Research Sample Schools

School	Public		Private	
	Population	Sampel	Population	Sampel
SMP	25	3	18	3
MTs	2	1	6	1

Based on the selection of schools, the total number of schools that became the research sample was 8, representing public and private schools in the city of Bengkulu. Choose one class VIII in every 8 randomly sampled schools, with each school getting the same chance.

2.3 Data Collection and Instruments

Data collection techniques are divided into two stages: tests and observations. Data collection on students' numeracy skills in solving minimum competency assessment questions is done by distributing test instruments in person and online. Meanwhile, observation is to collect information related to the implementation of learning in the classroom that is commonly done, and the level of questions for general evaluation is given. The instruments in this study were tests and non-tests. The test instrument in this study aims to measure students' numeracy skills in solving minimum competency assessment questions. The test instrument is in the form of short questions taken from the minimum competency assessment level 4 (class VIII) question grid. The questions are prepared to refer to the grid of questions quoted from the Research and Development Agency and Books of the Ministry of Education and Culture of the Republic of Indonesia. The instrument tested on the students consisted of 8 item questions with 4 multiple choice questions and 4 description questions. The questions are divided based on four material contexts: geometry with two questions, algebra with two questions, numbers with two questions, and data and probabilities of two questions with the same proportions. The non-test instrument in this study was a questionnaire aimed at gathering information about students' knowledge of minimum competency assessment. The questionnaire is a statement consisting of 8 items with answer choices ranging from 1-4 scores. The answer choices consist of: (1) don't know/never, (2) don't know/rarely, (3) know/never, and (4) know very well/rarely.

2.4 Data Analysis

Data analysis was carried out to describe students' numeracy skills based on student test results. Analysis based on scores obtained based on student answer sheets in solving students' minimum competency assessment questions. Scoring is done by giving a score of 1 if the answer is correct and a score of 0 if it is wrong in multiple choice questions. Whereas in the matter of explanation of explanations with a score range of 0-2. Scores are closed on a scale of 0-100 which is then determined by the average. Next, release in **Table 2** to determine the ability level of students.

Table 2. The Reference Level of Students' Numeracy Skills

Score range	Criteria
0-20	Very Low
21-40	Low
41-60	Middle
61-80	High
80-100	Very High

Data on the assessment results of students' general knowledge analysis related to implementing minimum competency assessment. The analysis of student knowledge is determined based on criteria with reference to Widoyoko (2009), where the assessment statement item consists of 8 items, and the assessment criteria are as in **Table 3.**

Table 3. Criteria for General Knowledge of Students

Interval	Criteria
x > 27	Very Good
$22 < x \leq 27$	Good
$18 < x \leq 22$	Moderate
$13 < x \leq 18$	Low
$x \leq 13$	Very Low

3. RESULTS AND DISCUSSION

3.1 Results

a.   Description of Research Result Data

The data from this study are based on analyzing the answers of 190 SMP/MTs students in Bengkulu City who became the research sample. Description of students' numeracy ability test results with an average score of 34.30, a maximum score of 75.00, and a standard deviation of 20.26. Based on this data, it can be concluded that the mastery of the material by students in solving minimum competency assessment questions on average has yet to reach 50%. This is shown by the research sample's average score, only 34.30 out of a maximum ideal score of 100. The level of mastery of students is based on the content of the material, namely: (1) algebra, (2) geometry, (3) numbers, and (4) data and opportunities are described based on multiple choice questions and descriptions. The following summarizes the results of student mastery in terms of material content.
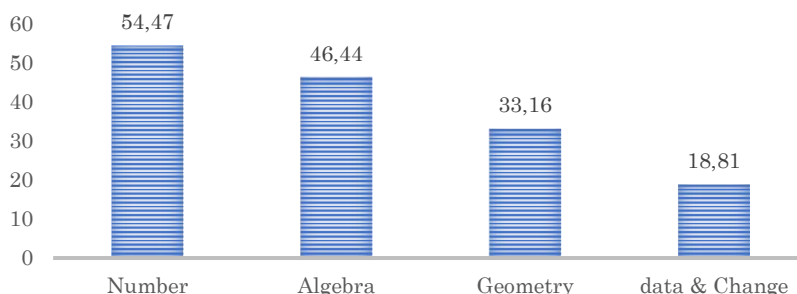

Figure 1. Description of student mastery based on material

The figure above shows students' highest mastery of the material is on the number of materials, with material mastery of 54.47%. The lowest material mastery is in data material and uncertainty 2e, which is 18.81%, a category of students' ability level in solving minimum competency assessment questions. Based on the analysis with a minimum score range of 0 and a maximum of 100, the student's ability level criteria are shown in **Table 4.**

Table 4. The Level of Students' Numeracy Skills

Ability Level	Number of Students	Percentage (%)
Very High	24	12.63
High	53	27.89
Moderate	50	26.32
Less	63	33.16
Very Less	24	12.63

The data in **Table 4** shows that the highest percentage of students' abilities is in a low category, with a rate of 33.16%. In other categories, there is no significant difference where the percentage in the high category is 27.89%. These results indicate that the distribution of students' numeracy abilities is, on average, at a low to moderate concentration level. This study also observed students' knowledge levels about implementing the minimum competency assessment. The level of student knowledge was measured using a questionnaire, with the results summarized in the **Table 5.**

Table 5. Students' Level of Knowledge on Minimum Competency Assessment

Knowledge level	Number of Students	Percentage (%)
Very Good	0	0.00
Good	8	4.21
Moderate	42	22.11
Less	92	48.42
Very less	48	25.26

The data in the table above concludes that, on average, students' knowledge regarding implementing the minimum competency assessment is still low. The data shows that the percentage of students in the poor category almost reaches a part of the total sample, which is 48.42% or as many as 92 students. At the same time, the good category is only 4.21% or as many as 8 people. These results indicate that, in general, students need to learn about implementing the minimum competency assessment test in schools. In addition, students need to know what aspects are measured and how the questions are tested. So that all parties need to socialize, especially students, as they are ready to face minimum competency assessment.

b.   The relationship between general knowledge and student numeracy

Analysis of the relationship between students' abilities and numeracy skills used the Chi-Square test with a 95% confidence level. The analysis using the help of SPSS showed that the Pearson Chi-Square value was 14.57 with a significance of 0.024. Due to the significant value of the test results of 0.024 <alpha = 0.05, it can be concluded that there is a relationship between students' knowledge of minimum competency assessment and students' numeracy skills in solving minimum competency assessment questions.

3.2 Discussion

The results of the research that we have presented show that, on average, students' mastery in each material domain on minimum competency assessment questions is still below 50% except for the number material with mastery of 54.47%. The lowest mastery is in the data material and uncertainty. The findings of this study are supported by data from previous research that has been done; Susanta et al. (2020) showed that students' mastery of the TIMSS type of geometry material was 36.39% (low category), and data and opportunity material with a mastery level of 50.40% (low category). The results of this study are also supported by research data that has been carried out by Anggraini & Setianingsih (2022), which states that students' mastery of the minimum competency assessment questions at the offering level is still low because, at this level, students have not been able to analyze and solve problems, while at the level of knowledge and application the category is moderate. Analysis of students' abilities in solving minimum completeness assessment questions is supported by analysis of student answer sheets. The following is an example of minimum competency assessment questions on the number of content tested on students.

Masalah: seleksi perguruan tinggi [Materi Bilangan]
Pada tes seleksi masuk perguruan tinggi setiap peserta harus mengerjakan soal berbentuk pilihan ganda berjumlah 50 butir dengan ketentuan sebagai berikut.
a. Jawaban benar mendapatkan skor 4
b. Jawaban salah mendapatkan skor -2
c. Soal tidak dijawab mendapatkan skor -1
Untuk diterima di universitas tersebut peserta seleksi minimal harus mendapatkan skor di atas 162. Budi dan ketiga kawannya yaitu Luki, Supeno dan Ryan mengikuti seleksi penerimaan mahasiswa baru Universitas Bengkulu dengan hasil tes sebagai berikut.

Nama	Betul	Salah	Tidak Dijawab
Budi	43	3	4
Luki	42	1	7
Superno	43	2	5
Ryan	44	6	0

Pertanyaan:
Siapa saja yang diterima di kampus Universitas Bengkulu?

Figure 2. Examples of minimum competency assessment-level reasoning

Translation
Problem: College Selection Test [Number]
Each participant must work on 50 multiple-choice questions in the college entrance selection test. Scoring with the following conditions.
a.   The correct answer gets a score of 4
b.   Wrong answers get a score of -2
c.   Questions do not answer the score -1

To be accepted at Bengkulu University, participants must at least get a score above 162. Budi and his friends, namely: Luki, Supeno, and Ryan took the new student admissions test at Bengkulu University with the following test results.

Name	True	False	Don't Answer
Budi	43	3	4
Luki	42	1	7
Superno	43	2	5
Ryan	44	6	0

Question:
Who is accepted at Bengkulu University?
The questions above require students to understand the concept of operations on integers and analyze which operations can be used to solve problems. These questions students must also draw conclusions based on the questions given. The analysis results of students' answers to this question, on average, students can answer with a percentage of 50%. However,

this result shows that students' mastery is still in the poor category. The following is an example of a student solving several material problems.

Figure 3. Example students answer

Based on students' answers in Figure 4, it is known that in carrying out operations, students can use the information in the questions to solve problems. Students have done the steps correctly and precisely. Students have accurately calculated the score of each prospective student on the question. However, in this case, the student misinterpreted the question's meaning from the question. Students misunderstand the requirements of a prospective student who is said to have passed, which must be more than 162. Students in the example answers conclude that Budi, Suparno, and Ryan meet the requirements but based on the calculation of the mind, they get a score of 162, so they do not pass college because the conditions must have a score above 162.

Based on the results of the analysis of student answers, the general ability of students is good. Still, in solving questions with the minimum competency assessment type, students must be able to analyze questions that are not routine and are rarely done by students in classroom learning. This is also because the literacy-based minimum competency assessment questions require students to be able to read problems and solve problems. This is Pangesti's opinion (2018), which states that numeracy literacy is needed to solve problems that require many ways of solving unstructured problems and problems with no solution. In addition, the implementation of minimum competency assessment provides numeracy skills with teachers processing learning and by directly introducing a problem around students (Nurgiyanto (2022).

The findings in this study are the lack of students' ability to analyze questions. In addition, the use of real contexts that are familiar to students needs to be emphasized so that it is easier for students to model mathematics. The research data shows that the level of student knowledge about the implementation of minimum competency assessment still needs to be higher. This means related information about the implementation, the form of the questions, and the material being tested. So that this has an impact on the readiness of students to participate in the implementation of the minimum competency assessment. The results of the Chi-square test analysis showed that there was a relationship between knowledge and students' numeracy skills. So, it is necessary to prepare and socialize students to improve their numeracy skills in solving minimum competency assessment-based questions. The results of this study are supported by research that has been carried out by Rokhim et al. (2021), which shows that 53.2% of students do not understand well about the national minimum competency assessment while teachers, as a sample of around 25% of teachers, does not understand the national assessment. Based on the results and findings of this study, it is necessary to emphasize socialization related to the implementation of minimum competency assessment, and the teacher should give minimum competency assessment-based questions to students.

4. CONCLUSION

The results showed that the student's mastery was based on the material aspects: (1) the student's mastery of numbers was 54.47%, (2) the mastery of algebraic material was 46.44%, (3) the student's mastery of geometry material was 33.15%, and (4) material data and opportunities of 18.81%. The analysis results of the level of student knowledge about implementing minimum competency assessment are, on average, in the less category with a percentage of 48.42%. Based on the results of the study, it is recommended that there be the socialization of the implementation of minimum competency assessment to teachers and students and the preparation of special questions so that students are accustomed to solving similar problems.

AUTHOR'S CONTRIBUTIONS

The authors discussed the results and contributed to from the start to final manuscript.

CONFLICT OF INTEREST

There are no conflicts of interest declared by the authors.

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