



Analysis of the Ability of SMP/MTs Mathematics Teachers in Making AKM Type Questions

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Abstract

The Minimum Competency Assessment (AKM) is a system used as a source of information to map and evaluate the quality of the education system that presents problems in various contexts. This study aimed to describe SMP/MTs mathematics teachers' ability to make AKM-type questions. This type of research is descriptive and qualitative with the survey method. The subjects of this study were the mathematics teachers of SMP/MTs in the Districts of Siak Kecil, Bukit Batu, and Bandar Laksamana, totaling 21 people, then the data taken were analyzed descriptively. The scoring guideline is based on the indicators for writing AKM questions contained in the scoring rubric. The results of this study indicate that the ability of teachers to make AKM-type questions is still low, namely, on context indicators, The questions made by the teacher have not used the context of numeration, both personal, scientific, and socio-cultural contexts, and on the stimulus indicators, teacher-made questions still use conventional stimuli, and there is no novelty in them. Teachers must have skills in making AKM-type questions, so training and guidance are needed.

Keywords: analysis; the ability of mathematics teachers; AKM-type questions

I. Introduction

The government through the ministry of education and culture has made a revolution in the field of education, one of which is the independent learning curriculum. There are four policies in the independent learning curriculum, including replacing the National Standard School Examination (USBN) by returning this program to school policy; The National Examination (UN) was replaced with AKM and character surveys; the thirteen components contained in the Learning Implementation Plan (RPP) were replaced into 3 components; and the New Student Admission Regulations (PPDB) which are

proportionally oriented (Anjelina et al., 2021).

Achievement and learning outcomes are the main elements of the high and low quality of education, as expressed by Lutfiyana et al., (2021) that the quality of education cannot be separated from the quality of teaching and learning which has an impact on student learning outcomes which include literacy, numeracy, and character. Assessment of literacy, numeracy, and character abilities is an assessment carried out in the National Assessment (Kemdikbud, 2021). The implementation of AN aims to describe the conditions, processes, and learning outcomes in schools

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so that they can improve the quality of education in schools, and in the regions as a result will accelerate the quality of education nationally (Novita et al., 2021).

The first National Assessment was carried out in 2021. In the implementation of the National Assessment there were three kinds of tests carried out, namely: (1) AKM; (2) character survey; and (3) Study survey (Kemdikbud, 2020). AKM is a minimum competency assessment and a substitute for UN (Nugraheny, 2021). In essence, AKM is a process of collecting data regarding the progress and learning outcomes of students on the competencies of attitudes, knowledge, and skills that are demonstrated thoroughly to solve the problems faced using the lowest standards, as conveyed by Sholikhan (2017) that the element that cannot be left behind in the activity of collecting data and information needed to be related to the learning process is that there must be an assessment of learning activities.

AKM is one of the measuring tools used by the government to measure the cognitive abilities of students including literacy and numeracy abilities, as revealed by Deviana & Aini (2022) that the AKM is an assessment used to measure the cognitive abilities of students. AKM is also a measuring tool for the basic abilities that students must have following the level of education taken (Sani, 2021).

The minimum ability assessment of students is carried out on content that is essential and sustainable across classes and levels (Pangesti, 2018). The term minimum can be interpreted that the content that is measured is not on all the content contained in the curriculum but focused on the essential content. The essential content measured by the Minimum Competency Assessment consists of reading literacy and numeracy literacy. Reading literacy and numeracy literacy are basic skills that

students need to possess at a certain level. Reading literacy and numeracy literacy skills are developed across subjects (Tohir, 2019).

AKM is an assessment of the basic competencies needed by all students to have the ability to develop self-capacity and participate positively in their environment (Irwandi et al., 2021). Fauziah et al. (2021) also said that AKM does not only collect information on the value of knowledge, but includes all assessment methods, namely the assessment of knowledge, abilities, attitudes, and motivation. So, AKM is a system that is used as a source of information to map and evaluate the quality of the education system that presents problems with variincontexts.

The implementation of AKM aims to improve the quality of education for the Indonesian people, besides that AKM is designed to produce information that can be used as an improvement in the learning process (Kusmaharti, Dian; Rita Fiantika, Feny; Hermin R, S; Yustitia, 2022). The implementation of AKM also aims to obtain information on improving the quality of education from time to time and the gaps in each part of the education system (Sari et al., 2021).

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The implementation of AKM is designed to obtain information about the quality of the teaching and learning process and the level of competence of students, which in turn is expected to improve the competence and learning outcomes of students. This level of competence can be used by teachers of various subjects to develop effective and queffectivelyrning strategies according to the level of achievement of students (MoEC, 2021). The competencies required of AKM are literacy and numeracy skills (Asrijanty, 2020). Literacy and numeracy skills are the minimum competencies that must be possessed by students.

Literacy skills are not only the ability to read but also the ability to analyze and understand the concepts contained in the text presented (Kartina et al., 2022). Likewise, numeracy skills are one of the literacy skills in mathematics, not only requiring the ability to calculate numbers or data, but also the ability to analyze, process, and conclude data. Following what was conveyed by Sari et al., (2021) that numeracy is the ability to think using concepts, procedures, facts, and mathematical tools to solve everyday

problems in various types of contexts that are relevant to individuals as citizens of Indonesia and the world. The same thing was also conveyed by Anas et al., (2021) that numeracy literacy is knowledge and skills that include: 1) the ability to use numbers and symbols to solve practical problems in various contexts in everyday life; 2) analyze the information displayed in various forms (graphs, tables, charts, and so on); 3) interpret the results of the analysis to make decisions.

Students need to have mathematical literacy skills to create efficient and effective mathematics learning, especially in the implementation of AKM, as expressed by Hidayati et al., (2020) that students need to have mathematical literacy skills because by having mathematical literacy skills students can interpret and solve everyday problems related to calculating data.

The AKM literacy and numeracy questions contain three components, namely (1) content, (2) cognitive processes, and (3) context (Tju & Murniarti, 2021). In reading literacy, the content contains informational and literary texts, the expected cognitive processes are finding information, understanding, evaluating, and reflecting, while the context includes personal, socio-cultural, and scientific. Numerical content includes algebra, numbers, geometry, measurement of data, and uncertainty, the cognitive processes expected are understanding, application, and reasoning, while the context includes personal, social, cultural, and scientific (Pusmenjar, 2020). These three main indicators underlie various developments and manufacture of AKM questions that will be used in the National Assessment.

The context of numeracy AKM in the personal, socio-cultural, and scientific contexts as conveyed by Pusmenjar (2020) is that the personal context includes a

person's personal life, such as work, hobbies, etc. Furthermore, the socio-cultural context includes local or regional, national, or global community or community problems. Likewise with the scientific context related to the application of mathematics in the universe and issues and topics related to science and technology.

Competencies assessed in reading and numeracy literacy include logical-systematic thinking skills, reasoning skills using concepts and knowledge that have been learned, as well as skills in sorting and processing information (Pusmenjar, 2021). Such knowledge and skills cannot be separated from the role of a teacher as an educator, therefore, as an educator, the teacher has a very important role in the competence of students in solving AKM questions properly.

Numerical ability is the ability to read and analyze mathematical sentences in various contexts, as stated by Ekowati et al., (2019) that numeracy skills are the ability to reason and interpret mathematical sentences to explain and predict phenomena or events in various contexts using concepts, procedures, and facts.

Teachers play an important role in preparing students to have reading and numeracy literacy skills that require higher-order thinking processes. As stated by Asrijanty (2020) that the questions presented at the AKM require a high-level thinking process based on the context of everyday life. So, teachers are highly required to be able to understand examples of AKM questions to be able to guide and create learning activities that train students in understanding and working on AKM questions. This can be done by training students to analyze, understand and translate into mathematical sentences. As stated by Handayu (2020) that when teaching and learning activities are taking place, students

are given a lot of experience solving everyday problems and using logic to translate questions into mathematical sentences.

The AKM questions that are developed must pay attention to the characteristics of the learning materials at each grade level (Rahmayanti & Affandi, 2021). In response to this, teachers are required to have the ability to prepare AKM questions. This is because the questions in the AKM emphasize more questions that require analytical skills and critical reasoning and can develop divergent thinking skills in students. The continuous development of AKM questions at various levels is carried out by teachers in the Education unit (Deviana & Aini, 2022).

The AKM question has been prepared by the central government with a predetermined process and flow (Pusmenjar, 2020). However, teachers must have the ability to make AKM-type questions, because by skillfully making AKM-type questions, teachers should also be able to create learning activities that foster literacy and numeracy competencies in the learning process. Noting this, it is necessary to analyze the teacher's ability to make AKM-type questions. As previous research conducted by Tju & Murniarti, (2021) mentions that teachers still provide standardized learning by providing assessments that are limited to memory testing, this is due to the lack of knowledge and understanding of teachers in designing and developing questions that foster students' literacy and numeracy competencies. Similar research was also carried out by Astuti et al., (2022) that the teacher has not been able to compile AKM questions.

Based on the background presented, the understanding and ability of teachers to make AKM-type questions are still very

worrying. Meanwhile, teachers have an important role and great responsibility for the effectiveness of the implementation of AKM.

Teachers must have adequate knowledge and understanding of the AKM concept, as conveyed by (Anas et al., 2021) that to achieve the objectives of implementing AKM optimally, teachers must have knowledge and competence about the concept and implementation of AKM. The same statement was also conveyed by Rohim et al., (2021) that teachers must have competencies related to AKM, especially in numeracy literacy. Kumalasani et al., (2022) also said that teachers should be able to make AKM-type questions to be applied to the learning process.

His previous research was conducted by Fauziah et al., (2021) analyzing the level of understanding of teachers on AKM, collecting data from survey results through the distribution of questionnaires. Further research carried out is to analyze the ability of teachers in preparing AKM questions by collecting qualitative data from teachers who attend workshops (Astuti et al., 2022).

The difference between this study and previous research is that this study aims to analyze and describe the readiness and ability of Mathematics teachers in making numeracy AKM-type questions without a workshop with qualitative data collection and to describe based on data from interviews conducted with representatives of several participating teachers. So, this research is more accurate because, in addition to collecting data qualitatively, this data is strengthened by interviewing the participant teachers to obtain the reasons for obtaining the data.

This research needs to be carried out because, in addition to the AKM questions made by the teacher, it will greatly affect the

results of the AKM implementation in the future, another reason is that there has been no similar research conducted in junior high schools in Siak Kecil sub-district. Bukit Batu, and Bandar Laksamana, especially in the ability to compose numeric AKM-type questions.

II. Research methods

This study uses a survey method, and the type of research is descriptive and qualitative. The descriptive method is used because it produces factual and accurate data. The data obtained were strengthened by interviews conducted with participating teachers to describe the ability of junior high school teachers in making numeric AKM-type questions. The data is processed quantitatively based on statistical information, and the resulting qualitative data is based on research results. The implementation of qualitative research aims to build knowledge through deeper and more detailed understanding and discovery. The stages carried out in this research are as follows: 1) formulating the problem and determining the purpose of the survey; 2) selecting data collection techniques; 3) creating a scoring rubric; 4) processing and analyzing data.

The data analysis technique carried out in this study consisted of three steps, namely: 1) reducing the data that had been obtained; 2) presenting data in tabular form; and 3) concluding the data obtained. Data reduction is an activity to summarize and focus on the things observed (Sugiyono, 2013).

The subjects of this study were mathematics teachers at the SMP/MTs level in the sub-districts of Siak Kecil, Bukit Batu, and Bandar Laksamana, totaling 21 people. Data collection activities were carried out during the joint MGMP activity, namely on March 23, 2022. The activity was carried out starting with the provision of material about

the characteristics of AKM questions, then continued with making individual AKM-type questions.

The ability of SMP/MTs mathematics teachers in making AKM-type questions is assessed based on the achievement of indicators that are modified from those set by (Pusmenjar, 2020) namely: 1) the teacher's ability to determine the content of the questions; 2) the teacher's ability to determine cognitive processes; 3) the ability to determine the context of the question; 4) the ability of the teacher to arrange the stimulus questions.

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The ability of mathematics teachers at the SMP/MTs level in the combined MGMP activities of three sub-districts in making AKM-type questions was assessed using a scoring rubric modified from Pusmenjar (2020). The scoring rubric is as follows:

Table 1.
Scoring rubric for middle/MTs mathematics teacher ability to make AKM questions

Indicator	Score	Assessment Criteria
Content	1	The question contains one of the numeric AKM content
	0	The question does not contain numeric AKM content
Cognitive Process	1	The question contains the cognitive process of numeracy AKM
	0	The question does not contain the cognitive

		process of numeracy AKM
Context	1	The question contains the context of numeracy AKM
	0	The question does not contain the context of numeracy AKM
Stimulus	1	The question contains the numeracy AKM stimulus
	0	The question does not contain the numeracy AKM stimulus

Table 1. Serves as a guide for the assessment of the AKM-type questions made by the teacher. The scoring rubric contained in table 1 is a modified achievement indicator from Pusmenjar, (2020).

III. Results and Discussion

The assessment of the ability of SMP/MTs teachers in making AKM-type questions is assessed based on the achievement indicators in making AKM questions contained in table 1, then the value obtained is determined by the percentage of achievement presented in tabular form. The recapitulation of the achievement value of SMP/MTs Mathematics teachers in making AKM-type questions is as follows:

Table 2.
Recapitulation of achievements of middle/MTs mathematics teachers in making AKM type questions

No	Achievement Indicator	Amount Reached	Achievement Percentage
1	Content	21	100%
2	Cognitive Process	21	100%
3	Context	12	57%
4	Stimulus	7	33.3%

Based on table 2, the ability of SMP/MTs Mathematics teachers will be discussed in making AKM-type questions on each required indicator.

Teacher's Ability to Determine Question Content

The questions made by the teacher have met the criteria for the content of the numeric AKM questions, as shown in Table 2. In the content indicator, all 21 questions made by the teacher have a score of 100%. The results of interviews conducted with participating teachers are that the content presented on the numeracy AKM questions is all content contained in mathematics subjects, this is what causes the teacher-made questions to have met the indicators for achieving numeracy AKM content. Here are one of the teacher-made numeracy AKM-type questions:

Buah durian atau yang dikenal dengan *Durio Zibethimus* memiliki potensi bisnis yang cukup menggiurkan di Kabupaten Bengkalis proses pemeliharaan tanaman ini terbilang cukup mudah. seorang petani ingin menanam pohon durian pada sebidang tanah yang berukuran 2 hektar, jenis durian yang akan ditanam adalah durian berbatang pendek sehingga membutuhkan jarak antar pohon minimal 8 meter. Berapakah banyak pohon yang harus ditanam oleh petani tersebut?

Figure 1. Questions about the type of AKM content Geometry

Image 1. shows that the question is included in the content of Geometry. Based on the scoring rubric that if the teacher makes a question containing 1 content, then the question is by the indicators of achievement of the AKM questions, although the content presented is still very simple, as the results of research conducted by (Astuti et al., 2022) that the content selection is correct but the arrangement is still very simple.

Teacher Ability Determines Cognitive Process

The cognitive level of questions is the level of thinking ability with levels from simple systems to the level of solving problems that are needed by someone to manipulate and use knowledge(Putri et al., 2018). The cognitive processes of the numeracy AKM questions consist of 1) Knowing (understanding); 2) Applying (application); and 3) Reasoning (reasoning)(Pusmenjar, 2020). In Table 2. it can be seen that the achievement of the cognitive process indicators of the numerical AKM Question from the questions made by the teacher is 21 people with a percentage of 100%. The following are teacher-made questions that have fulfilled the cognitive process of numeracy AKM questions:

Kabupaten Bengkalis memiliki lahan perkebunan yang luas, salah satu komoditi sektor perkebunan yang cukup besar di hasilkan adalah kebun karet. Salah satu warga Kabupaten Bengkalis yang memiliki kebun karet adalah Ayah Dimas, dia memiliki kebun karet yang luas, Dimas merasa kasian melihat ayahnya yang setiap hari menyadap karet harus berjalan dari satu pohon ke pohon lainnya yang terlihat kelelahan. Dimas terpikir untuk mencari jalan terdekat untuk dapat menyelesaikan menyadap karet. Dia membuat sketsa beberapa pohon dengan pemisalan huruf dan mengukur jarak antar pohon dengan menggunakan langkah kaki. Bantu dimas untuk membuat urutan pohon sehingga jumlah langkah sedikit dan bisa menyadap semua karet dengan pohon pertama di sadap adalah pohon A?

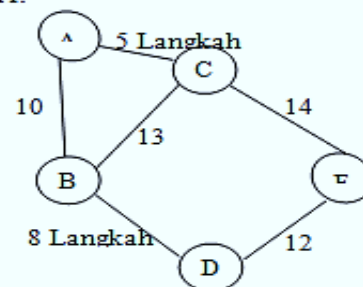


Figure 2. AKM-type questions using cognitive reasoning processes (reasoning)

Figure 2. shows the AKM questions with cognitive reasoning processes that the cognitive process of reasoning (reasoning) is the ability of mathematics to apply knowledge and understanding of facts, relations, processes, concepts, procedures, and methods in the context of real situations to solve problems (Pusmenjar, 2020). Based on the scoring rubric in table 1. that if the question contains 1 cognitive process, then the question has met the indicators of achievement of the AKM questions. So, all the questions made by the teacher have met the criteria for the cognitive process of the numeracy AKM question, although most of the questions made by the teacher are still very simple. The results of the same study were also found by Astuti et al., (2022), that the cognitive processes used have not described the desired cognitive processes on the AKM questions.

Teacher Ability to Determine Context

The context of the numerical AKM questions consists of 1) Personal; 2) Social Culture; 3) Scientific (Pusmenjar, 2020). In table 2. it can be seen that the achievement of context indicators is as many as 12 teachers who have made questions that are in the context of the AKM with an achievement percentage of 57%. The following are teacher-made questions that do not meet the numeracy AKM context indicators:

Angga mempunyai kelereng yang berwarna putih 36, berwarna merah 72, dan 84 berwarna kuning. Semua kelereng akan dibagikan kepada teman-temannya dengan jumlah sama banyak. Jumlah kelereng yang diterima masing-masing anak adalah...

a. 16	c. 14
b. 12	d. 18

Figure 3. Questions that do not meet the numeric AKM context indicators

Based on Table 1. that the questions in Figure 3. have not met the indicators of the numeracy AKM context, both personal, socio-cultural, and scientific contexts, because the questions in Figure 3. have not presented the context of numeracy, both personal, socio-cultural, and scientific contexts. Most are still very simple and quotes from the internet. Similar findings were also made by Astuti et al., (2022) that in making AKM-type questions, the teacher has not prepared the appropriate context for the AKM questions.

Teacher's Ability to Determine Stimulus

Another important aspect of the AKM question is the stimulus. In Table 2. teacher-made questions that have met the indicators of achievement of the AKM questions are 7 people out of 21 people with a percentage of 33.3%. This number shows that the ability of mathematics teachers in the Districts of Siak Kecil, Bukit Batu, and Bandar Laksamana in preparing the stimulus is still very low. The following are the types of teacher-made AKM questions whose stimulus does not meet the criteria for AKM questions:

Ayah memiliki Sebuah kolam berbentuk lingkaran berjari-jari 40 meter. Di sekeliling tepi kolam dibuat jalan melingkar selebar 5 meter. Jika biaya untuk membuat jalan tiap 1 m² adalah Rp20.000, hitunglah seluruh biaya untuk membuat jalan tersebut.

a. Rp 20.017.500
b. Rp 26.690.000
c. Rp 24.690.000
d. Rp 25. 017.500

Figure 4. Teacher-made questions that do not meet the stimulus indicators for AKM questions

Based on Table 1. That the teacher-made questions contained in Figure 4. do not meet the AKM stimulus indicators because the questions in Figure 4. still use

conventional stimuli, there are still stimuli that are adopted from the internet and there is no novelty in the stimulus used. The preparation of the stimulus on the AKM question has been determined, as conveyed by Pusmenjar (2020) that the preparation of the stimulus for numeracy AKM questions must meet the following criteria: 1) the stimulus is prepared based on the context of the Sustainable Development Goals; 2) the stimulus that is arranged must be by the domains and subdomains of a certain class level, and 3) in the context stimulus there must be a novelty. The results of the same study were also found by Astuti et al., (2022) that in compiling the stimulus for AKM-based questions, teachers are still very weak because they use shallow sentences or texts and take sentences as they are from existing texts.

The AKM-type questions made by teachers have not been maximized as determined by the Ministry of Education and Culture regarding the rules for AKM questions, due to the ability and understanding of mathematics teachers in the districts of Siak Kecil, Bukit Batu, and Bandar Laksamana that are still very low, this happens because teachers have not received training and guidance on making about AKM, therefore training and guidance are needed so that mathematics teachers in the sub-districts of Siak Kecil, Bukit Batu, and Bandar Laksamana are proficient in making AKM type questions, As stated by (Izzati & Febrian, 2021) that teachers must receive intensive assistance to be able to make good and correct questions based on the expected achievement indicators.

Previous research conducted by Astuti et al., (2022) analyzes the ability of junior high school teachers in making AKM questions, while this study focuses on analyzing the abilities of junior high school mathematics teachers.

IV. Conclusion

The results showed that the ability of mathematics teachers at the SMP/MTs level in Siak Kecil, Bukit Batu, and Bandar Laksamana sub-districts in making AKM-type questions still did not meet the achievement indicators set by the Ministry of Education and Culture. These shortcomings can be seen in the teacher's ability to determine context questions that have been made have not used the context of numeration, both personal, scientific, and socio-cultural contexts, and on the indicators of compiling the stimulus, the teacher-made questions still use conventional stimuli and there is no novelty in them. Based on interviews conducted with several participating teachers, this happened because of the teacher's low understanding of the concept of AKM questions. The ability of teachers to make AKM-type questions is still very low because there is no guidance from the local government to SMP/MTs teachers related to AKM-type questions, therefore teachers need intensive assistance to SMP/MTs mathematics teachers, especially in making AKM-type questions. in the form of workshops, training, or other forms of assistance.

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