



ABILITY TO COMPOSE NUMERATION LITERACY QUESTIONS BASED ON AKMI'S SKILLS THROUGH BLENDED LEARNING

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Abstract

The numeracy literacy competencies of students based on AKMI standards are categorized into five levels of proficiency. The results of the AKMI 2021 show that the average numeracy literacy index of students is still low, namely at the level of proficiency, requiring intervention, and proficiency level. One of the factors causing these problems is the lack of habituation to practice numeracy literacy questions in learning due to the low ability of educators to make numeracy literacy questions. This study aims to improve educators' ability to prepare numeracy literacy questions based on the AKMI proficiency level through blended learning. This classroom action research involved 63 Madrasah Ibtidaiyah educators throughout East Java. The research instrument was in the form of an assessment rubric for the ability to compose questions, observation sheets, interview guidelines, and field notes. Data collection techniques were carried out by observation and interviews. The data analysis technique used is comparative descriptive. The results showed that there was an increase in the ability of educators in compiling numeracy literacy questions based on the AKMI proficiency level, which was indicated by the average achievement of the ability of educators in the first cycle at a minimum proficiency level of 54%, and in the first cycle, it had increased to 96.8 %. The application of Blended Learning also experienced an increase, which was 70% in the first cycle and reached 93% in the second cycle

Keywords: numeracy literacy; AKMI; blended learning.

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INTRODUCTION

The Indonesian Madrasah Competency Assessment (AKMI) is a comprehensive assessment of the literacy competence of madrasah students. AKMI was held for the first time in 2021, starting at the Madrasah Ibtidaiyah (MI) level. The results of the AKMI provide an overview of the mapping of student competencies according to their level of proficiency. The ability to solve AKMI questions will determine which level each student is at. There are five

levels of student proficiency based on AKMI standards, namely the level of need for intervention, basic level, proficient level, skill level, and level of need for creative space (Kemenag RI, 2021).

The Director of Curriculum, Facilities, Institutions and Student Affairs of the Ministry of Religion of the Republic of Indonesia stated that the results of the 2021 AKMI show that the average literacy index of MI students is still 32.69% where the dominating proficiency level is the level of need for intervention and the level of proficiency. The data is an accumulation of four literacy assessed by AKMI, namely numeracy literacy, reading, social culture, and science. In detail, the data shows that the numeracy literacy skills of students at the level of need for intervention are 29%, 46% at the basic level, 10% at the proficient level, 5% at the skilled level, and only 1% at the level requiring creative space (<https://kemenag.go.id/read/ini-potret-enam-kelompok-hasil-asesmen-kompetensi-siswa-mi-tertinggi-yogyakarta-m7jl7>).

Numerical literacy is the ability to analyze and understand narratives using reasoning. This ability is carried out through the application of concepts, calculations, and measurements that are displayed in various representations, either graphs, tables, charts, or others. Furthermore, the information is used to interpret, predict and or make decisions (Kemendikbud, 2017). Andreas Schleicher in the 2019 OECD report stated that numeracy literacy skills for students are skills used to protect students in the future against unemployment, low income, and health. In everyday life, numeracy literacy skills are needed when making buying and selling transactions, planning an activity, or doing savings and loans. In addition, students need to understand information related to health problems, the economy, population data, and others where all of this information is expressed in the form of numbers or graphs (Schleicher, 2019).

Three basic principles of numeracy literacy, namely; contextual, in line with the scope of mathematics in the 2013 curriculum; and interdependence and enriching other elements of literacy (Kemendikbud, 2017). This principle is relevant to the implementation of the High Order Thinking Skill (HOTS) question. HOTS questions in learning mathematics are intended to train students

to think at higher levels through the process of analyzing, evaluating, and creating.

Among the characteristics of the HOTS questions, namely: (1) measuring the students' HOT abilities, which are not just the ability to remember, know, or repeat so that the answers to questions are not explicitly stated in the stimulus, but analyze, evaluate and create activities are needed. (2) based on current (partially) contextual and actual issues, for example regarding the surrounding environment, health, geology and space, as well as the use of science and technology in various aspects of life. (3) presented in the form of varied questions as used by PISA, to provide detailed and complete information about students' abilities (Dirjendikdasmen, 2017).

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Research (Mulyono et al., 2019) shows that the ability of educators in making numeracy literacy questions that measure students' HOTS abilities is still quite low. The results of the pretest related to the preparation of HOTS-based questions in learning conducted on 50 educators from five different elementary schools in Surakarta showed that there were 32 educators (64%) who had not completed the pretest or only 18 educators were declared complete. In another study (Maimunah et al., 2020) with the subject of prospective mathematics educators, it was found that HOTS-based questions at the creative level were only able to be solved by 10 out of 20 research subjects, where no one could solve them correctly and precisely.

This study aims to improve the ability of educators, especially MI educators in preparing AKMI-based numeracy literacy questions. Efforts to increase this ability are carried out through Blended Learning (BL). Blended learning is a learning model that combines two modes, namely face-to-face and digital-based or online. In the post-pandemic era, this model is the main solution for the continuity of learning in Indonesia, and even throughout the world.

Previous research on the preparation of numerical literacy-based questions has been carried out by several researchers who focus on blended learning in the form of online and offline, including the research conducted by Hanik, et al (2020) on improving the competence of educators in integrating HOTS (Higher Order Thinking Skills) in learning. The relevance of this research is the combination of online and offline learning. In addition, one of the characteristics of numeracy literacy questions is that they are based on HOTS questions. While the new aspect that distinguishes this research from the previous one is online learning, besides using whatsapp, zoom meetings and the Learning Management System (LMS) are also used where previous research only uses whatsapp. Based on the background that has been described, the researcher is interested in conducting research with the title of increasing the ability of educators to prepare numeracy literacy questions based on the AKMI proficiency level through blended learning.

METHOD

This research is a classroom action research (CAR) with a qualitative approach. The PTK design used refers to the Kemmis and McTaggart models. This model consists of four main components, namely planning, action, observation, and reflection. At the planning stage, presentation materials and blended learning-based learning designs are prepared. In the implementation phase, Cycle I learning is carried out online with the Learning Management System (LMS) and Whatsapp Group (WaG) applications for 2 (three) days and offline meetings for 2 (four) days, then Cycle II, online learning through zoom meetings for 3 (day). Observations are made through WaG monitoring, LMS,

zoom meetings, and offline. The research subjects were educators of Madrasah Ibtidaiyah (MI) throughout East Java, totaling 63 people with the background of class educators (class teachers) and mathematics subject educators (male teachers).

The research instrument consisted of observation sheets and interview guidelines. Data collection techniques used are observation and interviews. Observations were made online (zoom meeting and LMS) or offline. While the interviews were conducted online (zoom meeting). Interviews were conducted openly, in a classical form. Each subject was interviewed in front of all the other subjects so that multidirectional communication occurred. Other subjects were allowed to ask questions to the subjects interviewed by the researcher.

The data analysis technique of this research is comparative descriptive, with qualitative and quantitative data types. Qualitative data analysis refers to the four stages proposed by Miles and Huberman, namely (1) Data Collection, (2) Data Reduction, (3) Data Display, and (4) Conclusion Drawing/verification (Miles, et al, 2014). While quantitative analysis, researchers divide the criteria for the form of data assessment as follows:

Very good	= 4
Good	= 3
Enough	= 2
Not good	= 1

The data is processed by adding up the scores obtained by the subject from all the questions. Next, determine the average score by dividing the total score obtained by the number of questions available. The success of classroom action research is determined as adapted from thinking (Djamarah, SB and Zain, 2016), namely the implementation of learning based on blended learning ($\geq 75\%$) each cycle and educators have been able to arrange numeric literacy questions based on five levels of proficiency, with a minimum category level three (proficient level) of 75%.

RESULT AND DISCUSSION

The research subjects were 63 educators who were divided into 2 (two) different classes. The number of each class is 21 people and 22 people. This research was conducted in 2 (two) cycles. The following is a description of the results of the research that has been carried out.

Pre Cycle

Before conducting the research, preliminary observations were made to determine the initial conditions of the educators regarding the ability to compose numeracy literacy questions. Meetings are conducted online using Zoom Meeting. The technique used in this observation is to interview educators in turn. Based on the results of the interviews, it was concluded that, in general, educators do not know numeracy literacy based on five levels of proficiency in the AKMI (Kemenag RI, 2021), as presented in the following table.

Table 1. Description of AKMI Proficiency Level Activities

Level	Description of Student Activities/Behavior
Need Creative Space	Concluding, justifying, and formulating the results of his work appropriately related to solving complex and non-routine problems
Skilled	Select, compare and evaluate complex and non-routine problem-solving strategies
Competent	Apply mathematical knowledge; modeling and analyzing and solving problems in more diverse contexts
Based	Classifying information; performing calculations and measurements; demonstrating mastery of mathematical concepts; having basic math and computing skills and solving routine problems
Need Intervention	Classifying information; performing calculations and measurements; demonstrating mastery of mathematical concepts; having basic math and computing skills and solving routine problems

Based on the description in table 1. above, the characteristics of the questions at each level are formulated as follows.

Table 2. Characteristics of Questions based on Five AKMI Proficiency Levels

Level	Characteristics of Questions
Need Creative Space	The problems presented are in the form of complex and non-routine problems, which require students' skills to make conclusions, justifications, and formulations of work results.
Skilled	The problems presented are in the form of complex and non-routine problems, which require students' skills to select, compare and evaluate problem-solving strategies.
Competent	The problems presented are in the form of problems with various contexts, which require students' skills to apply their mathematical knowledge, create models/patterns and analyze these problems.
Based	The problems presented are in the form of routine problems that require students' skills to classify information, perform calculations and measurements as well basic computing
Need Intervention	The problems presented are in the form of simple math problems that require students' skills to partially remember and identify conceptual information, as well as limited computational skills

Cycle 1

At the **planning** stage, researchers mapped the initial abilities of educators based on observations. The mapping is then used as a reference for grouping. The composition of the group formed is heterogeneous. Adjusted to the background of the assignment of educators in schools and differences in school origin. Observations also show that educators are familiar with the term numeracy literacy through the Minimum Competency Assessment (AKM) activity organized by the ministry of education and culture in 2019. However, the specific differences between AKMI and AKMI are still not fully understood.

Furthermore, the activities carried out at **the action** stage are online learning, namely through LMS for two days. The materials presented in the LMS are introductory material on AKMI's, basic concepts of numeracy literacy, learning scenarios, and numerical literacy-based questions. It is hoped that through the LMS material, educators have an initial understanding of the numeracy competency assessment framework based on the AKMI standard.

During the two learning days, the researcher monitored the achievement of the material sessions that had been studied by each educator through the LMS.

Continued offline learning with the number of meetings twice. Each meeting was held for 3 JP (180 minutes). The discussion method was used by researchers at the first meeting to reflect on the material that had been studied through LMS. Meanwhile, at the second meeting, the cooperative learning method was used, where participants compiled numeracy literacy questions in groups and continued with the presentation of the results of group discussions in front of the class. At the end of the lesson, each educator is given the task of compiling their respective questions based on five levels of proficiency.

Observations of the learning activities of educators, besides being carried out through LMS, are also carried out through Whatsapp Groups (WaG). In LMS researchers, the learning progress of each educator is monitored in the form of percentages. While observations through WAG were carried out by researchers through the question and answer method, namely by asking educators one by one regarding the progress and obstacles faced and concepts that had not been understood.

The results of **the reflection** show that the blended learning model has been implemented well, which is 70%, but it is not effective enough in building educators' understanding of the material being studied. This is because many educators have not mastered the use of zoom meetings properly. In addition, bad weather problems in some areas affect the stability of the internet signal. Meanwhile, the ability of educators in compiling numeracy literacy questions that meet five levels of proficiency has not yet reached the classical success indicator of 75% at a minimum level of 75%. The following is the percentage of achievement in the ability to prepare questions by educators.

Table 3. Percentage of Ability to Compile Questions

Question Level	Frequency	Percentage
Need Creative Space	3	4.8%
Skilled	5	7.9%
Competent	29	46.0%

Question Level	Frequency	Percentage
Based	21	33.3%
Need Intervention	5	7.9%
Total	63	100.0%

Table 3. This shows that the ability of educators in preparing literacy questions on average is still in the basic and proficient categories. In accumulation, the achievement of the ability of educators in preparing questions at a minimum level of proficiency is 54% or as many as 37 educators. The results of interviews with educators indicate that among the difficulties educators have in compiling questions is that they are still confused about distinguishing the characteristics of questions at each level of proficiency, especially at the basic level and above. In addition, the lack of habituation of educators in presenting numeracy literacy problems for students is also one of the challenges. Several educators admitted that when teaching in class they still tend to use simple routine questions, which do not hone literacy skills. So that student are not accustomed to literacy and only gain experience in procedural mastery, without understanding the concept. Even though one way to grow students' higher-order thinking skills can be done through giving tests in the form of HOT questions where these questions also hone students' literacy skills (Intan et al., 2020).

Cycle 2

The planning stage in cycle 2 was designed by considering the results of the reflection of cycle 1. Researchers designed learning without using the group learning method but using the mentoring method. The coaching method is a method that involves stimulus activities, giving powerful questions, and a creative dialogue that directs educators to get the best results (Helmi, 2021).

The researcher prepared a control card to write down the progress of each educator in detail. Another preparation is the mentoring schedule so that each educator gets a balanced time allocation. In addition to the schedule, a guided inquiry learning step design was also made. To avoid bad signal problems, every educator is asked to find a supportive place before learning begins. The researcher

also provides a technical introduction to the use of the zoom application for participants.

Actions in cycle II were carried out by online learning, namely through zoom meetings. Meetings were held 2 times with a time allocation of 90 minutes for each meeting. Learning is still carried out in a classical form. Each educator is coached by researchers according to a predetermined schedule. Guidance is carried out openly and is listened to by other educators who are not being mentored. In addition, they are allowed to provide suggestions, ask questions, or feedback to their friends who are being mentored.

Observations on the learning activities of educators were carried out by researchers during the learning process. Therefore, to obtain good observations, the researchers recorded the guidance activities of each educator. In addition, field notes remain a research instrument that supports observational data.

The results of **the reflection** show that the learning model is implemented well, with an achievement of 93%. All steps are carried out according to plan and educators are increasingly proficient in using the Zoom meeting application. During the process, the researcher provided an opportunity for several educators to be involved as the person in charge of recording, documenting, and checking online attendance. The obstacle that is rather difficult to avoid is signal interference in some educators, but it does not last long. The following are the results of the process of preparing questions.

Table 4. Percentage of Problem Compiling Ability Achievements

Question Level	Frequency	Percentage
Need Creative Space	9	14.3%
Skilled	14	22.2%
Competent	38	60.3%
Based	2	3.2%
Need Intervention	0	0%
Totally	63	100.0%

Table 4. This shows that the ability of educators in preparing literacy questions is on average in the proficient category. In accumulation, the

achievement of the ability of educators in preparing questions at the minimum proficiency level is 96.8% or as many as 61 educators. However, the ability of educators in compiling questions at the level of need for creative space still needs further development. The results of interviews with educators indicate that educators have been able to distinguish the characteristics that distinguish questions at each level. However, at the level of need for creative space, many educators still find it difficult. This is due to the lack of mastery of the mathematical concepts of educators to design questions that involve students' higher-order thinking skills. Muyijem in his research on fourth-grade elementary school teachers in the Nuri Cluster, Ngombol District, found that most educators were still unable to make their HOT questions (Muyijem, 2019)

CONCLUSION

Based on the results of the research and discussion, it was concluded that improving the ability of educators in compiling numeracy literacy questions based on the AKMI proficiency level was carried out with intensive online and offline coaching through the Learning Management System (LMS) and Whatsapp Group (WaG) applications and offline. Coaching is done individually and is listened to by all educators in the class. The results showed an increase in the average achievement of the ability of educators in the first cycle at a minimum proficiency level of 54%, and in the first cycle, it had increased to 96.8%. The Blended Learning learning model applied also experienced an increase, which was 70% in Cycle I and reached 93% in Cycle II.

Referring to the analysis and conclusions of this study, a recommendation is made that this research has an impact on improving the ability of educators in preparing numeracy-based questions which in turn helps educators improve the learning process. Therefore, it is hoped that the ministry of religion and schools will continue to carry out research or similar services for all madrasa educators. The limitations of the research in terms of the subject and material are still specific, it is recommended for the next researcher to further expand the

subject and scope of research material and use more diverse methods so that it can be used as a generalization.

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