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DEVELOPMENT OF MATHEMATICAL LITERACY PROBLEMS IN THE MINIMUM COMPETENCY ASSESSMENT (AKM) FOR CLASS VIII STUDENTS OF JUNIOR HIGH SCHOOL

Syifa-Ul Fatimatuz Zuhro[1*], **Anton Jaelani**[2]

[1,2]Departement of Mathematics Education, University of Muhammadiyah Purwokerto, Indonesia
*Corresponding Author: syifaftmtzhr1407@gmail.com

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ABSTRACT

The replacement of the National Examination into the 2021 National Assessment which consists of 3 elements, namely AKM, character survey, and learning environment survey. The Minimum Competency Assessment (AKM) focuses on students' ability to master reading literacy and numeracy literacy so that students are required to have good mathematical literacy skills. This research is a Research and Development study which aims to (1) produce mathematical literacy questions on the minimum competency assessment (produce valid and reliable mathematical literacy questions in the minimum competency assessment (AKM) for class VIII SMP students in the form of an essay test.; (2) Knowing students' responses to the mathematical literacy problems being developed. This research was carried out in class VIII H of SMP N 9 Purwokerto, by carrying out one product trial phase for 80 minutes. The AKM standards used in developing mathematical literacy questions contain three components, namely content, context and cognitive processes, with material content limitations including algebra, plane figures, arithmetic rows and series, data presentation and comparison. The instruments in this research used mathematical literacy question sheets, teacher response questionnaires, and validator sheets. The model used in this development is the Thiagaradjan, and Semmel & Semmel 4-D model which consists of four stages; (1) Define; (2) Design; (3) Develop; and (4) Disseminate. However, this research has only reached the 3D or Develop stage. The limit of question content is middle school material for grades 7 and 8. The results of the research show that the level of validity of mathematical literacy questions in the Minimum Competency Assessment (AKM) has the criteria of "valid" because it meets the requirements of ≥75 with a percentage per item reaching more than of 75% and the overall percentage obtained a score of 81%. The reliability calculation results for question package A are 0.67 and question package B is 0.65, so these two questions can be said to be "reliable". Apart from that, students' responses to mathematical literacy questions showed "good" criteria with a percentage of 82%, this means that mathematical literacy questions made students interested in the questions being developed.

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A. INTRODUCTION

Mathematics is one of the sciences that is useful in human life (Tampubolon et al., 2019). Even mathematics is often dubbed as the root of science because it has a very large role in life (Anwar, 2018). The role of mathematics can be seen from the mathematical abilities possessed by a person. This mathematical ability is not just the ability to count, according to (Fathani, 2016) Mathematical ability also includes the ability to think critically and logically in solving problems. Solving these problems is not just a problem in the form of questions but problems related to human life. This mathematical ability is called the ability of mathematical literacy (Sari, 2015).

Mathematical literacy skills are currently being discussed in the world of education, because mathematical literacy skills can be said to be very important for students to be able to solve problems for their lives. (Trisnaningtyas & Khotimah, 2022). The results of research related to PISA show that there are still students with low abilities when testing mathematical literacy abilities in several types of content and contexts (Khoirudin et al., 2017).

Minimum Competency Assessment (AKM) focuses on students' skills in mastering reading literacy and numeracy literacy (Rohim et al., 2021). This change is one of the efforts to improve the quality of education

in Indonesia. This happens because the learning ability of students in Indonesia is still relatively low, both at the elementary and high school levels.

The importance of students' mathematical abilities, a teacher must be able to carry out learning activities aimed at guiding students to be able to have good mathematical abilities. Learning planning, implementation of learning and assessment or evaluation of learning must be in accordance with the curriculum currently used, namely the 2013 curriculum. The learning steps based on the 2013 curriculum are observing, questioning, associating, experimenting. , and networking (summing up).

Based on observations by researchers at SMP N 9 Purwokerto with one of the class VIII mathematics teachers, they said that the test questions used at the school were still based on mathematics textbooks and had not discussed mathematical literacy questions which referred to AKM. Apart from that, AKM issues have not developed much, so AKM issues available on the internet are still limited. Therefore, researchers believe it is necessary to develop mathematical literacy questions that refer to AKM to increase the availability of questions and provide students with an overview of mathematical literacy questions on AKM. There are several AKM questions that have been developed that refer to Banyumas culture such as the lengger dance, this is one of the updates to the AKM questions compared to the questions usually found. to increase the availability of questions and provide students with an overview of mathematical literacy questions on AKM.

B. RESEARCH METHODS

This research was conducted in class VIII H of SMP Negeri 9 Purwokerto, totaling 34 students. This type of research is research and development. This research method uses the Thiagarajan 4D development model. The stages of this development model include Define, Design, Develop and Disseminate. However, this research only reached the 3D stage, namely Develop.

In the Define stage, researchers carry out front-end analysis related to curriculum, learning materials, student analysis, and concept analysis. Then in the next stage of Design, the researcher chose the test format, namely in the form of descriptive questions, created a grid of questions and arranged test items according to class VII and VIII material which included material on comparisons, flat figures, rows and arithmetic series, as well as the 2013 curriculum which then produce draft I in the form of an essay test. At the development stage, draft I was given to 2 validators for validation. Validators are asked to carry out qualitative validation based on the content, constructs and language of the questions developed. Comments/suggestions from validators are used as material for revising draft I. The valid results of the revised draft I are called draft II.

After the questions were validated and a valid category was obtained, the next stage was a field trial carried out in class VIII H with 34 test subjects to provide comments/suggestions and fill out a questionnaire on student responses to the questions and analyze the level of reliability. of items that have been developed. . Question reliability analysis is carried out with the aim of assessing the stability or reliability of the questions so that they can be used and relied on. The data collection techniques used in this research are: 1) interviews. Interviews were conducted at the front-end stage with teachers regarding the curriculum, learning materials, student characteristics, and at the post-trial stage to determine students' responses to the readability of the questions given. 2) data collection instruments, namely documents, validation sheets, and student response questionnaire sheets. The document in question is a mathematical literacy question sheet on AKM. The data analysis techniques applied in this research are:

1. Question validity

Validity data was obtained from validation instruments submitted to the validators, namely one mathematics education lecturer and one mathematics teacher. To calculate the validity of the validation sheet, namely using the percentage per item after finding the average per item with the formula:

$$P = \frac{\bar{x}}{N} x\ 100\%$$

Information:
Information:
P = score percentage
$\bar{x}$ = average value
N = max score

Mathematical literacy questions in the Minimum Competency Assessment (AKM) for class VIII students of junior high schools that are designed can be said to be valid if the average percentage of the validation questionnaire has reached % ≥75%

2. Question Reliability

Analysis of the reliability of the questions was carried out with the aim of assessing the stability or determination of the questions so that they can be used and relied upon. Analysis of the reliability of the questions can be searched by the following descriptions that have been tested:

$$\beta = \left(\frac{M}{M-1}\right)\left(1 - \frac{\sum_{i=1}^{m} S^2}{S^2}\right)$$

Information :
β = reliability coefficient test package
M = the number of test items
$\sum_{i=1}^{m} S^2$ = total variance of the items
S^2 = total variance
The design of the test items is declared reliable if the minimum reliability criteria is high (more than 0.60) (Arikunto, 2010).

3. Student Response

Analysis of student responses was used to determine positive responses from students after the limited trial phase. Acquisition of student responses can be calculated by the formula:

$$P = \frac{\sum x}{N} \, x \, 100\%$$

Information :
P = score percentage
$\sum x$ = the total score obtained
N = maximum total score
Student responses are said to be good for mathematical literacy questions if the percentage score from the student response questionnaire has reached the value ≥ 75%

C. RESULT AND DISCUSSION

Define stage

At this stage, the results were obtained that learning in classes VIII and IX used the 2013 curriculum, while class VII used the independent curriculum. Based on the results of the interview, difficulties in mathematics material were found in several materials such as composite geometry, social arithmetic, arithmetic series and rows, and probability. The limits of learning content in developing mathematical literacy questions are class 7 and 8 material which includes comparison, data presentation, SPLDV, arithmetic series and rows, plane figures and Algebra. At the learning evaluation stage, the teacher said that the questions given in the evaluation process were questions available in textbooks, which were routine questions and less challenging for students and did not refer to mathematical literacy questions except in the AKM process. The results of the student analysis stage regarding the abilities of students at SMP N 9 Purwokerto varied, namely from students with low, medium and high abilities.

Design Stage

At the format selection stage. The researcher used the three contexts in the AKM questions, namely the individual context, the socio-cultural context and the scientific context. For the content of the questions the researcher uses the four contents namely number content, space and form content, change and relationship content as well as uncertainty content and data. Likewise with cognitive processes, which include all processes in AKM questions, namely understanding, application and reasoning. The question format used in the mathematical literacy questions in this AKM is a description question. After the format selection stage, the researcher then designed a grid and 12 mathematical literacy questions according to the 2013 curriculum and according to aspects of the AKM the results of this question design were called Draft 1.

Develop stage

At this stage draft 1 is given to 2 validators to be validated according to the criteria, namely content, construct, and language. This validator comes from a lecturer in mathematics at UIN Prof. KH Saifuddin Zuhri Purwokerto and a mathematics teacher from SMP N 9 Purwokerto. The first validation process resulted in the product being suitable for use with revisions from the two validators, then after the researchers revised according to input from the validator, draft 1 was included in the criteria for being suitable for testing without revision which then produced draft 2 for testing. The results of the question validation assessment from the validator can be seen in the following table:

Table 1. Results of the Validation of the Questions

Question Number	Percentage	Criteria
1	77%	Valid
2	75%	Valid
3	79%	Valid
4	79%	Valid
5	80%	Valid
6	85%	Valid
7	85%	Valid
8	84%	Valid
9	85%	Valid
10	75%	Valid
11	86%	Valid
12	81%	Valid
Average	81%	

In the table above, it can be concluded that all items have reached a percentage of more than 75% and the overall percentage is 81% so that the mathematical literacy questions can be said to be "valid". Based on research conducted by (Muzalifah, 2021) 10 mathematical literacy questions were developed is valid based on expert assessments and field trials.

After the literacy questions were said to be valid, the next stage was a trial conducted in class VIII H with 34 students as subjects. The trial phase was carried out with a time allocation of 80 minutes. Question package A or question package B was done randomly by 34 students, each question package contained 6 literacy questions. At this trial stage, students are asked to read, understand the intent and purpose of the questions and provide comments/suggestions on the questions given, as well as fill in the answer sheets provided. The results of the student response questionnaire obtained a question percentage value of 82%. Because the student response questionnaire score has reached ≥75%, it can be concluded that the literacy questions have reached the "good" category so they can be used for the evaluation process in learning.

After the trial process, the results of the literacy test were analyzed for the acquisition of scores and workmanship errors in students. After the trial process, the literacy test results were analyzed for students' scores and work errors. Students' work errors include errors in the concept of comparison, errors in reading bar charts in questions, and inaccurate use of arithmetic row formulas. The results of the score analysis from student work then analyzed the level of reliability. The reliability analysis of the questions was carried out with the aim of assessing the stability or determination of the questions so that they can be used and relied upon. Based on the calculation of the reliability coefficient for question package A is 0.67 and the reliability coefficient for package B is 0.65. Because 0.67 and 0.65 are above 0.60, the two question packages are said to be "reliable".

The analysis of errors in students was quite varied, ranging from errors in the concept of comparison, lack of understanding of the material for arithmetic rows and series, errors in arithmetic row formulas, and the concept of SPLDV. The results of the acquisition of the mathematical literacy score, the researchers compared with the PAS scores in mathematics to get an overview of the comparison of student scores. The comparison can be seen through the following graph:

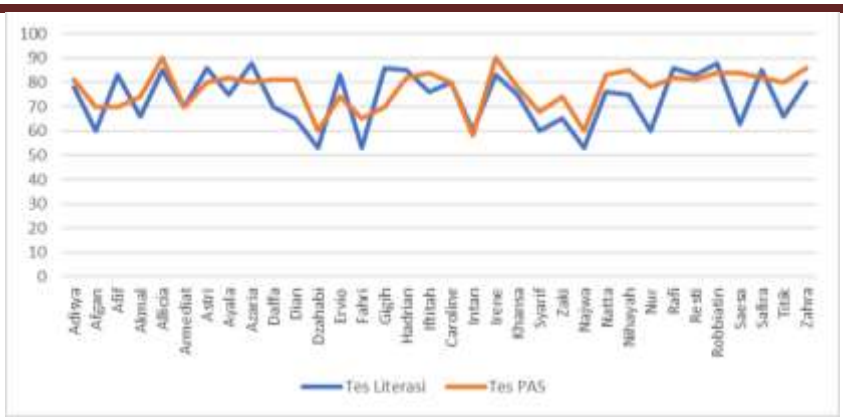

Figure 1. Value Chart

From the graphic image above it can be seen that the PAS scores of students' mathematics subjects and the scores of the mathematical literacy test can be seen to be quite parallel, where the increase and decrease of the line can be seen almost the same between the PAS mathematics test and mathematical literacy, but still the graph of the highest score remains on the PAS score of mathematics, it can be concluded that most of the students in class VIII H of SMP N 9 Purwokerto mastered ordinary math problems compared to mathematical literacy questions. This was also conveyed by 5 students during the interview stage, they said that mathematical literacy questions were difficult, they were not used to working on literacy type questions and they preferred to do ordinary math problems compared to mathematical literacy questions.

D. CONCLUSION AND SUGGESTIONS

By using Thiagarajan's learning device development model, namely the 4D model, mathematical literacy questions were produced in the Minimum Competency Assessment (AKM). According to experts or validators, the mathematical literacy questions developed are included in the valid category for each question item and are worthy of being tested. The validation results of the mathematics literacy questions showed valid results with the percentage of each question reaching more than 75% from both validators and the overall average reaching a percentage of 81%. The results of the student questionnaire responses to the development of mathematical literacy questions obtained an overall average of 82%, which means that the mathematical literacy questions were included in the good category. The reliability calculation for question package A is 0.67 and question package B is 0.65

The comparison graph of student scores on the PAS test and the mathematical literacy test looks quite equal, but the majority of class VIII H students mastered ordinary mathematics questions better than mathematical literacy questions. From the results of interviews with five students after the trial phase, it can be concluded that according to them the mathematical literacy questions were difficult questions, apart from the fact that they were not used to working on literacy type questions, they also had difficulty understanding the essence of the questions. given problem. Mathematical literacy question designs can be developed more focused by taking one aspect of the context or content in the literacy aspect and can be disseminated in a wider scope.

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