ANALYSIS OF MATHEMATICAL LITERACY IN WORKING ON MINIMUM COMPETENCY ASSESSMENT QUESTIONS REVIEWED FROM ADVERSITY QUOTIENT

Asa Aulia Issabilillah[1],
Venissa Dian Mawarsari[2],
Iswahyudi Joko Suprayitno[3]
[1,2,3]Mathematics Education, Faculty of Education and Humanities, Unimus
Jl. Kedungmundu Raya No. 18 Semarang , 50273
venissa@unimus.ac.id

ABSTRACT

This research is a descriptive qualitative research. School selection in this study used proportionate stratified random sampling technique, as well as sample selection using purpose sampling technique, namely 8th grade students of SMP Muhammadiyah Bumiayu. Data collection techniques in this study were ARP tests,AKM tests, interviews and documentation. The results of the study state that the higher and lower the AQ that students have, it will affect their mathematical literacyskills and the results of working on AKM questions. Climber students will try theirbest to solve problems related to mathematical literacy. Camper students will try but not optimally. Quitters students give up very easily when solving math problems related to literacy. Based on this analysis, the researcher provides suggestions so that studentsin the quitter category can be assisted by familiarizing students in interpreting problems, composing solutions with the right procedures so that they can master mathematical literacy skills well. For students who are camper and climber types can be accustomed to solving problems according to the right procedure so that they can master mathematical literacy skills even better.

Keywords: Mathematical Literacy, Minimum Competency Assessment, Adversity Quotient.

INTRODUCTION

Mathematical literacy is a very important ability because it is related to the role and usefulness of mathematics in daily life. *The Organisation for Economic Co-operation and Development* (OECD) defines mathematical literacy as the ability to formulate, use, and interpret mathematics in a variety of contexts involving mathematical reasoning and the use of mathematical concepts, prosedur dan fakta untuk mendeskripsikan, menjelaskan, dan memprediksi fenomena (OECD, 2019). Subjects, especially mathematics, are often called difficult by students due to a lack of understanding of concepts and

the use of learning such as difficulties in the process of formulating problems, interpreting the context of concrete situations into mathematical models, and knowing mathematical structures with correlations or patterns in problems (Syawahid, 2019). This gives that the importance of mathematics subjects in the context of mathematics education in schools (Panggabean & Tamba, 2020).

Sometimes in solving mathematical problems it is found that there are students who show excellent abilities, there are students who show mediocre abilities and there are students who experience difficulties, this is because a person can solve a problem well if supported by the ability to face obstacles well. One of these psychological aspects is a person's intelligence in facing difficulties known as *Adversity Quotient* (Hidayat & Ratna Sariningsih, 2018; Mawarsari, Prihaswati, et al., 2024). From here, AQ is considered to have an important role in solving problems. Therefore, it is necessary to conduct research on the detailed analysis of students' mathematical literacy skills in solving AKM questions based on students' AQ abilities. This research was conducted at the junior high school level with level two and three questions to analyze students' literacy skills in completing AKM questions which contain three components, namely content, cognitive processes and context (Ministry of Education and Culture, 2020).

From the above problems, to face these difficulties, intelligence is needed that is able to help students survive or called adversity quotient (Rahmalina et al., 2020). Individuals with good AQ can survive in the face of constant difficulties and changes (Hartosujono, 2017; Mawarsari, Larasati, et al., 2024). Therefore, it is necessary to share about students' difficulties in dealing with problems and provide students with the habit of solving problems in structured stages.

METHOD

The type of research used is descriptive qualitative research. Qualitative research methods are research methods based on the philosophy of postpositivism, used to research on natural object conditions, (as opposed to experiments) where the researcher is the key instrument, data collection techniques are carried out in triangulation (combined), data analysis is inductive/qualitative, and qualitative research results emphasize meaning rather than generalization (Sugiyono, 2019: 9). The sample in this study is junior high school students in grade VIII, the selection of the sample is because AKM in junior high school is carried out in grade VIII (Ministry of Education and Culture, 2021).

Table 1:
Categories of Students' Mathematical Literacy Skills

Value Range	Criterion
80 ≤ x ≤ 100	Tall
55 ≤ x ≤ 80	Keep
0 ≤ x ≤ 55	Low

Stoltz (2018:119) revealed that to measure a person's AQ, an instrument called *the Adversity Response Profile* was used. The ARP used at first was the standard ARP from Stoltz which had been translated, but after going through validation, the ARP questionnaire was considered too difficult for students to understand, so the author revised the questionnaire according to the direction of the validator but still guided by the standard ARP questionnaire. The ARP consists of 20 questions describing events.

Table 2:
Categorization of AQ by ARP

Score	Category/type
0-59	*Quitters*
60-134	*Campers*
135-200	*Climbers*

Expert validation or called content validation is validation that is estimated through testing the feasibility or relevance of the test content through rational analysis by a competent panel or through *expert judgement* (Hendryadi, 2017). Analysis of the validity of test questions by material experts, subject matter expert test question validators provide scores for each iten with answers very appropriate (4), appropriate (3), moderately appropriate (2), not appropriate (1) (Riyani *et al.,* 2017). The creation of a validation instrument grid is based on the characteristics of AKM questions (Arifin, 2021).

The calculation of the results of expert validation by adding up the total score of each validator and finding the average validity using the following formula:

$$VR = \frac{\sum_{i=1}^{n} V}{n}$$

(Riyani *et al*., 2017)

Information:
VR = average validity

$\bar{V}$ average score of each validator
n = many validators

The value obtained is then classified for validity. The classification of the validity of the content of the instrument is based on (Riyani *et al*, 2017) in table 3.2. next:

Table 3:
Criteria for Categorizing Question Validity

Score Interval	Category
$3 \leq VR \leq 4$	Sangat Valid
$2 \leq VR < 3$	Valid
$1 \leq VR < 2$	Kurang Valid
$0 \leq VR < 1$	Invalid

(Riyani *et al.,l* 2017)

FINDINGS AND DISCUSSION

Based on the results of the research that has been carried out, there is a grouping based on AQ intelligence in students. The total number of students was 25 students, 6 students were at the *Climbers level,* 12 students were at the *Campers* level and 7 students were at the *Quitters level.*

Figure 1:
Percentage of AQ Capability

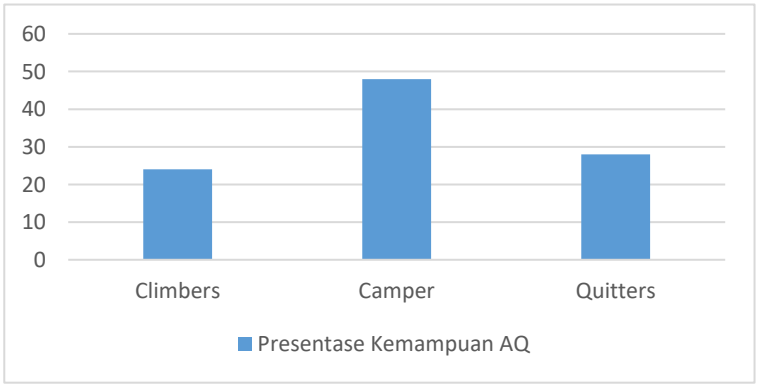

Figure 4.1 shows that the majority of students have AQ ability pada tingkat *Campers* are 48% of the number of students at the Climbers level , which is 24% and at the *Quitters* level, which is 28%, which means that more students have fighting power or AQ at the medium to lower level or at the Campers to *Quitters level,* so that students have difficulties in doing AKM questions.

Based on the results of the research that has been carried out, it can be seen that the results of the analysis of the work carried out by students from 10

AKM questions are very diverse. The percentage of the results of the analysis of students' ability to do AKM questions for each question can be seen in the table and figure below.

Table 4:
Mathematical Literacy Ability of *Climbers Type Students*

No Question	Formulating the Problem	Implementing the Concept	Interpreting the Settlement Results
1	12.09%	10.00%	15.25 %
2	13.19%	11.67%	10.17 %
3	10.44%	11.11%	16.38 %
4	10.44%	14.44%	6.78%
5	8.79%	11.11%	13.56%
6	4.40%	5.56%	1.60%
7	12.64%	13.33%	14.12%
8	5.49%	3.89%	10.17%
9	13.74%	10.00%	2.82%
10	8.70%	8.89%	9.04%
Sum	**100%**	**100%**	**100%**

The ability of the Climbers type AQ can be seen that in the stage of formulating the most problems done by students at number 9, which is 13.74%, while formulating the least problems by students at number 6, which is 4.40%. At the stage of applying the concept, the most students did it at number 4, which was 14.44%, while applying the least concept was done by students at number 8, which was 3.89%. At the stage of interpreting the results of the most settlements, the most students at number 3 were 16.38%, while interpreting the results of the least settlement was done by students at number 6, which was 1.60%. Of the three levels of mathematical literacy ability, many students who have Climbers-type AQ ability are correct to the highest level of mathematical literacy ability, namely interpreting the results of the solution.

Table 5:
Mathematical Literacy Ability of *Camper Type Students*

No Question	Formulating the Problem	Implementing the Concept	Interpreting the Settlement Results
1	9.61%	14.57%	12.53%
2	11.58%	8.38%	11.21%
3	4.19%	15.57%	5.05%
4	6.40%	1.60%	13.41%
5	11.33%	11.18%	9.67%
6	10.34%	10.78%	12.09%
7	11.58%	10.38%	7.69%
6	15.27%	3.39%	10.99%
9	10.10%	17.37%	9.67%
10	9.61%	6.79%	7.69%
Sum	**100%**	**100%**	**100%**

It can be seen that in the stage of formulating the most problems are done by students at number 6, which is 15.27%, while formulating the least problems are done by students at number 3, which is 4.19%. At the stage of applying the concept, the most students did it at number 9, which was 17.37%, while applying the least concept was done by students at number 6, which was 3.39%. At the stage of interpreting the results of the most settlements, students at number 4 were at 13.41%, while interpreting the results of the least settlement were made by students at number 3, which was 5.05%. Of the three levels of mathematical literacy ability, students who have the ability to AQ *type Campers* are many correct only up to the second level of mathematical literacy ability, namely formulating problems.

Table 6:
Mathematical Literacy Ability of *Quitters Type Students*

No Question	Formulating the Problem	Implementing the Concept	Interpreting the Settlement Results
1	10.88%	7.02%	3.92%
2	14.91%	11.11%	6.49%
3	11.93%	14.04%	11.01%
4	11.47%	12.28%	12.07%

5	10.18%	11.70%	14.63%
6	10.77%	11.11%	7.99%
7	3.16%	5.85%	10.26%
6	9.02%	9.94%	8.60%
9	5.96%	1.17%	12.37%
10	11.72%	15.79%	12.67%
Sum	**100%**	**100%**	**100%**

It can be seen that in the stage of formulating the most problems are done by students at number 6, which is 15.27%, while formulating the least problems are done by students at number 3, which is 4.19%. At the stage of applying the concept, the most students did it at number 2, which was 14.91%, while applying the least concept was done by students at number 7, which was 3.16%. At the stage of interpreting the results of the most settlements, the most students at number 5 were 14.63%, while interpreting the results of the least settlement were done by students at number 1, which was 3.92%. From ketiga tingkatan kemampuan literasi mathematics, students who have *Quitters-type AQ abilities are correct* only up to the level of the first mathematical literacy ability, which is to apply concepts.

Based on a series of activities that have been carried out, both the AQ test, the numeracy AKM question test, interviews, and documentation, various kinds of findings in the field related to students' literacy ability in solving numeracy AKM questions are reviewed from *the adversity quotient*, including the following.

Mathematical Literacy Ability of Adversity Students *Quotient* Tipe *Climber*

Based on the analysis of research that has been carried out, the mathematical literacy ability with the *Adversity Quotient* personality of the *Climber* type is able to go through the three phases of mathematical literacy, namely formulating problems, applying concepts, facts, procedures and mathematical reasoning and interpreting, applying and evaluating mathematical results. This is in line with the results of research conducted by (Santoso, R. M., and Setyaningsih, N, 2020: 70), that students who have high mathematical literacy skills can solve problems with communication skills, mathematization, determining problem-solving strategies, using mathematical operations and language, reasoning, and analyzing. This is in line

with the opinion (Rosita & Rocmad, 2016) that high AQ type students are able to explain and write correctly what information is known and asked about the problem. Students with high AQ types are able to obtain solutions to the problems they face (Widyastuti, et al. 2013).

Mathematical Literacy Ability of Adversity Students *Quotient* Tipe *Camper*

In the phase of formulating a problem, subjects with a camper type can identify the mathematical aspects of a problem in a real context, translate the problem into mathematical language and understand the relationship of symbols to the context of the problem. Subjects with a camper type mentioned the information contained in the problem and knew the sufficiency of the elements needed to find a solution, but *the camper* subject in some questions was still lacking in explaining the information contained in the problem. In line with the opinions of Prameswari and Khabibah (in Nilasari & Anggreini, 2019) which shows that *the camper subject* is still lacking in explaining the information on the problem, so when writing the solution is not complete and detailed. The camper subject when writing the example of mathematical signs is still incorrect, this is because the subject does not master the difference in symbols. The cause of the camper subject's error is because he does not pay attention to the use of symbols and lacks mastery of concepts to load mathematical models (Hutami et al., 2020).

In the phase of applying mathematical concepts, facts, procedures and reasoning, subjects with the *camper* type apply strategies to find mathematical solutions, apply facts, rules, algorithms and mathematical structures. In questions number 1, 4, 5 and 8, *camper type subjects* are able to understand the problem well and use the formula correctly. The camper subject knows the steps to solve the problem and is able to write down each calculation operation. This step replaces the variables that have already been written down with what is already known. In line with the results of the study (Mawardhiyah & Manoy (2018), it shows that *camper students* perform calculation operations in sequence to get the results of the formula that has been written. Camper subjects are also able to explain their answers well during interviews. This shows that there is an ability to communicate verbally in the *camper* type. This is in accordance with one of the characteristics of students with *the camper type*, which is very easily satisfied.

In the phase of interpreting, applying and evaluating mathematical results, subjects with a camper type reinterpret mathematical results to real problems, and evaluate their work. The *camper* type subject admitted that he

had evaluated his answer. However, the subject has not been able to detect errors in his work. This indicates that there is inaccuracy in conducting evaluations. This is in accordance with one of the characteristics that students with the *camper type* have, namely they are satisfied with what they have achieved.

Mathematical Literacy Ability of Adversity Students *Quotient* Tipe *Quitters*

In the phase of formulating the problem, subjects with the type *of quitters* seen in problems number 1, 2, 7 and 9 have not been able to identify the mathematical aspects of a problem in a real context, translate the problem into mathematical language and understand the relationship of symbols to the context of the problem. Many quitters type subjects have not been able to write down the information contained in the questions consistently and have not been able to write down the information contained and are unable to explain the relationship between symbols and the context of the problem. The subject quitter in the formulation process takes a long time because when doing it repeatedly reads the questions. In accordance with the findings of the Nilasari & Anggreini (2019) research, that the subject is still motivated by the question sheet when explaining the meaning of the question and reading it many times to understand the relationship of the question.

In the phase of applying mathematical concepts, facts, procedures and reasoning, in questions number 1, 2, 7 and 9 subjects with the *quitters* type are not able to understand the problem well and cannot use the formula correctly in solving the problem in the problem. *Quitters-type* subjects also make mistakes in using mathematical concepts in solving problems. In questions number 1, 8 and 10, the *quitters* type showed the right solution but the results given were not neat because there was a missed formula. The subject *of quitters* performs a calculation operation to get the result of the formula that has been written. The results of the research by Rahmawati et al. (2015), show that *quitters* students when solving problems are in accordance with the plan and steps to solve them, but are still not thorough when finding answers. This is in accordance with the research of Quintasari, et al. (2021) stating that students with AQ *qiutters* are unable to compile evidence, provide reasons or evidence for some correct solutions from the steps used in solving the problem.

In the phase of interpreting, applying and evaluating mathematical results, the *subject of quitters* writes conclusions on their answers and evaluates them correctly. In question number 1, and 8 subjects *quitters* wrote

the conclusion on the answer. In evaluating the subjects, *quitters* were less thorough and unable to detect errors in their answers. In line with (Rismen et al., 2022) that students do not write how to turn real problems into mathematical problems, so their answers in solving problems and deducing mathematical solutions are unacceptable. This phenomenon can also be caused because the majority of students are still unable to relate and apply their mathematical literacy skills in solving contextual problems (Auliya et al., 2021). Even though one of the goals in education, students are expected to be able to solve mathematical problems with their skills and understanding (Putri & Purwanto, 2022). However, when learning, the majority of students still struggle to solve mathematical problems, especially related to story problems (Panggabean et al., 2022; Mawarsari et al., 2024).

Conclusion

Based on the focus of the initial research and the results of the research obtained, the researcher concluded that the students' mathematical literacy ability in working on AKM problems was reviewed from *the Adversity Quotient* of grade VIII of SMP Muhammadiyah Bumiayu. Students' mathematical literacy skills are reviewed from *the Adversity Quotient* (AQ) ability in doing AKM problems, the results show that the higher the AQ that students have, the higher their mathematical literacy ability and the results of doing AKM problems students get higher scores as well, and vice versa, the lower the level of AQ that students have, the lower the level of mathematical literacy ability and the results of doing AKM problems.

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