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## Numerical Minimum Competence Assessment for Increasing Students' Interest in Mathematics

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### ABSTRACTS

The aim of this research is whether the numerical minimum competency assessment can be one of the learning media to increases students' interest, especially in mathematics. To support this research, we used quantitative research methods, namely data collection was carried out using a series of research instruments in the form of a numerical minimum competency assessment test, both pre-test and post-test using google form media. This numerical minimum competency assessment test was given to find out how far the ability and interest of students in mathematics. There were 10 questions given to 11 students. Based on the results of the study, the number of students' interest in learning scores increased from 500 to 900. This happened because the minimum competency assessment media literacy got a positive response from students. After all, the minimum competency assessment questions used pictures and stories so that it could be said that the minimum competency assessment was interesting for students. Therefore, it could be concluded that the use of minimum competency assessment media literacy in learning mathematics increased students' interest in learning.

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## 1. INTRODUCTION

Student's learning interest in mathematics subjects is low. Students sometimes have given up before they are trying to understand mathematics. There are even some students who think that there is no point in studying mathematics because it will not be used in everyday life. This is a wrong assumption. Critical thinking skills are needed in making a decision to do or believe something that begins with reasoning and reflective thinking (Ennis, 2013; Fascione, 2000). Critical thinking aims to give confidence or not to the claims given. Critical thinking is closely related to mathematics, especially in solving problems. Nowadays, mathematical literacy is very important. According to Organisation for Economic Co-operation and Development (OECD) mathematical literacy ability is an individual's ability to formulate, use and interpret mathematics in various contexts. It is further explained that this includes mathematical reasoning and using concepts, procedures, facts and mathematical tools to explain and predict phenomena.

Based on data from the Ministry of Education and Culture (2019), Indonesia's mathematics scores in the program Program for International Student Assessment (PISA) decreased. In the year of 2018 mathematics score was ranked 72 out of 78 countries while in 2015 it was ranked 68. This was due to low scientific literacy. According to Organisation for Economic Co-operation and Development (OECD) mathematical scientific literacy is a person's ability to apply their knowledge to identify questions, construct new knowledge, provide scientific explanations, draw conclusions based on scientific evidence, and the ability to develop a reflective mindset so that they are able to participate by addressing issues and ideas related to science. The low level of scientific literacy is influenced by several factors such as student interest in learning and non-contextual learning (Fuadi et al., 2020). Hence, we try to use literacy media for minimum competency assessment to increase students' interest in mathematics in particular.

Low learning interest can be caused by several factors such as learning media and learning quality (Yanti & Sumianto, 2021). Teachers must find some ways to increase students' interest in learning by learning online. The form of assessment which is part of the learning quality process needs improvement. This is what then underlies changing the form of assessment in learning. If previously the assessment used a content-based model, at this time the assessment must be competency-based. The real form of these concepts and principles is the design of the minimum competency assessment which aims to obtain information on student learning progress which in turn can trigger improvements in the quality of learning and be able to improve student learning outcomes. The minimum competency assessments held in Indonesia are reading literacy and numeracy literacy with the assumption that these two are general and basic competencies that must be mastered by students. The reason for the minimum competency assessment choosing literacy and numeracy is because reading literacy and numeracy are the two minimum competencies for students to learn for life and can contribute to society.

This minimum competency assessment measures the literacy and numeracy abilities of students carried out at every level of education in grades 4, 8 and 11 with various types of levels at each level. One of the things that refers to an individual's ability to formulate, use and interpret mathematics in a good context (Wulandari & Azka, 2018). By suggesting that the meaning of numeracy is not only being able to carry out procedures in solving mathematical problems but also utilizing mathematics into everyday life, as in literate which has meaning (literacy) for mathematics (Aningsih, 2018). Therefore, this assessment is expected to increase the interest of students in Indonesia, one of which is mathematics.

Nowadays, many studies discuss the increase in students' interest in learning mathematics. The results of the study show that a realistic mathematical approach can increase students' interest in learning (Fatimah *et al.*, 2021). Other research shows that the active, creative, effective and fun learning model can increase interest in learning mathematics (Samosir *et al.*, 2020). There are studies that have examined the increase in interest in learning mathematics through puzzle games (Utami, 2013). Other studies have increased interest in learning mathematics through the realistic math approach (Herzamzam, 2018). Other research results have increased interest in learning mathematics using inquiry based learning setting group investigation (Silviani *et al.*, 2017). However, at this time there is no research that discusses the numerical minimum competency assessment in increasing students' interest in mathematics.

Based on the background description above, the purpose of this research is whether the numerical minimum competency assessment can be one of the learning media to increase students' interest, especially in mathematics. Here we uses quantitative research methods. From the results of the study, it was found that the number of students' interest in learning scores increased by 400. This happened because the minimum competency assessment literacy media used a lot of pictures and stories so that it was interesting for students.

## **2. THEORETICAL FRAMEWORK**

### **2.1. Mathematics**

Mathematics is a science that examines abstract objects and prioritizes deductive reasoning. Mathematical objects are objects of thought that are abstract and cannot be observed with the five senses (Sulistiani, 2016). Learning mathematics requires appropriate media because, a factor that causes the low quality of learning, among others, has not been utilized optimally by learning resources and learning media, both by teachers and by students. In addition, mathematics is one of the subjects that the system needs in training its reasoning. Through teaching mathematics, it is hoped that it will increase abilities, develop skills and applications. However, the process of teaching and learning mathematics is difficult for students to understand. In fact, many complain that mathematics is boring, uninteresting and difficult to understand. Because of that, mathematics learning outcomes are lower than other subjects. In this regard, students cannot be fully blamed if their mathematics learning outcomes are lower. This is not only a factor of the students themselves but because there are other factors. So in an effort to improve student learning outcomes, especially in these mathematics subjects, the factors that affect the results of students learning mathematics need to get serious attention.

### **2.2. Minimum Competency Assessment**

The main components of education are divided into three, namely curriculum, learning and assessment. The curriculum covers what will be learned. Learning is about how to achieve the goal to master the material in accordance with the curriculum. While the assessment measures everything that has been learned, anything and to what extent. Assessment is the application of using assessment tools to obtain as much information as possible about the extent to which students are successful in mastering certain competencies. Minimum competency assessment is held to obtain information to improve the quality of learning so that it is hoped that it will also improve student learning outcomes. The implementation of the assessment does not only measure the mastery of knowledge material in accordance with the curriculum, but is specifically designed to determine the quality of education as a whole

and make improvements to the quality of education that is felt to be lacking. The main focus of minimum competency assessment is on the fulfillment of students' reading literacy and numeracy literacy skills (Cahyana, 2020).

The results of the minimum competency assessment are intended to present information about the level of ability possessed by students. This is what teachers will use in designing learning using innovative learning strategies that are effective and of high quality according to the level of student achievement. Learning designed according to the level of student achievement is expected to facilitate students in mastering the content of a subject. The minimum competency assessment question instrument does not only contain the topic or content of a particular material but includes content, context and cognitive processes that students must go through. The implementation of this competency assessment makes teachers have to be more creative in compiling assessment instruments for students (Nehru, 2019). Indirectly, teachers who teach using conventional models must also be replaced with creative and innovative learning models according to the conditions needed. The implementation of the competency assessment has a student centered learning approach (Nehru, 2019). Student centered learning is a student-centered learning approach where the teacher only acts as a facilitator. This is because the implementation of learning that is conservative or conventional cannot be a forum for implementing national assessments. By increasing the role of students in the learning process, it will be easier to master numeracy literacy which is one of the minimum competency assessment targets.

### 3. METHODS

#### 3.1. Research Focus

The focus of research is needed so that the results of research writing can provide a directed understanding in accordance with expectations. The focus of this research is as follows:

- (D) The research respondents were 11 students of junior high school 39 Bandung, Indonesia in class VIII who had been selected by the teachers of junior high school to take part in the minimum competency assessment lesson. From of the 11 students, 3 were male students and 8 were female students.
- (ii) The research only used a numeric type of minimum competency assessment.

#### 3.2. Research Procedure

This quantitative method was done through filling out 10 items of numerical minimum competency assessment as in the research instrument, using the google form as the research instrument. Questions in the form of a google form were distributed to students through the whatsapp group to see the abilities and interests of students to work on the numerical minimum competency assessment questions. Correct answers are worth 10 points, while incorrect answers are worth 0. The total correct score is 100 (if students answer all questions correctly, then the maximum score is 100).

After the pre-test was done, students will have taken part in learning for at least 4 meetings to learn and practice the numerical minimum competency assessment questions. After the learning has been completed, students will again be asked to work on post-test questions to see if there is an increase in students' numerical Minimum Competency Assessment abilities after the numerical minimum competency assessment learning is carried out.

### 3.3. Research Instrument

The instrument used in this study is based on the questions in the assessment test numerical minimum competence. **Figures 1** and **2** show examples of questions in assessment test numerical minimum competence. The questions are:

- (i) Kenny is looking at an article on Science and find in **Figure 1**. **Figure 1** shows various kinds of electromagnetic waves arranged according to their frequency in Hz. The color which has a higher frequency than green but lower than purple is...
  - A. blue
  - B. orange
  - C. red
  - D. yellow
- (ii) One day, Mayer is strolling around some point. Mayer's itinerary is shown in the **Figure 2** there are 5 points where Mayer stops, namely points A, B, C, D, and E. To reach certain points, Mayer spends energy equivalent to the number shown in the picture. As the illustration: Mayer wants to reach point B from point A. The route to B Requires 1 energy. From point B to point E requires 2 energies. So, if Mayer goes from A to B, then to E, then it consumes a total of 3 energy. This route can be written as ABE. At this point, Mayer is at point A armed with x energy. If Mayer then goes the ABCADE route, and what remains is 7 energies, Mayer's initial total energy is ... energy.
  - A. 31
  - B. 35
  - C. 32
  - D. 33

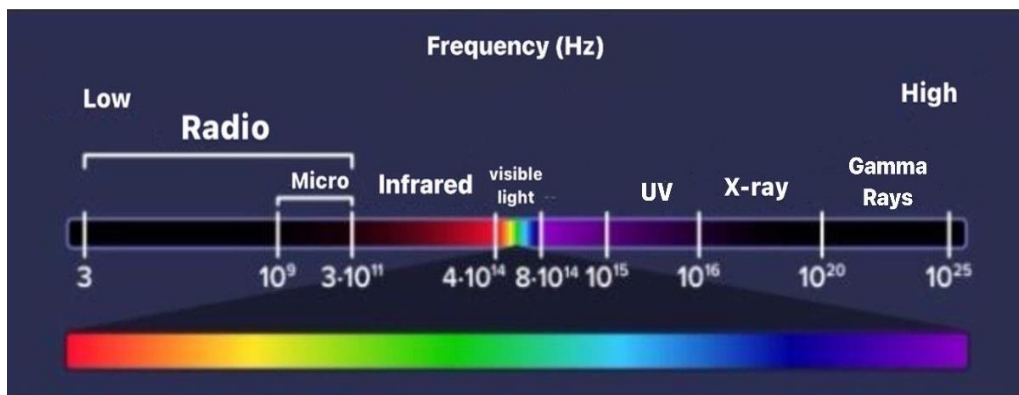


Figure 1. Electromagnetic.

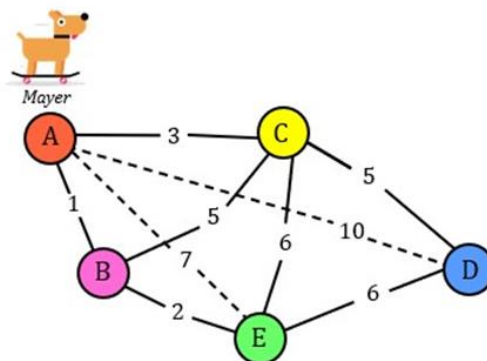


Figure 2. Mayer itinerary.

## 4. RESULTS AND DISCUSSION

### 4.1. Demography

As already informed that the student who fill out the google form are the student of choice, then the academic of the student is very good. The students achieved both academic and non-academic achievements. Their mathematics values are good enough but this minimum competence assessment is a new thing for them. From of the 11 students, 3 were male students and 8 were female students. In **Figure 3**, it can be seen the comparison of students in terms of gender who filled out the minimum competency assessment.

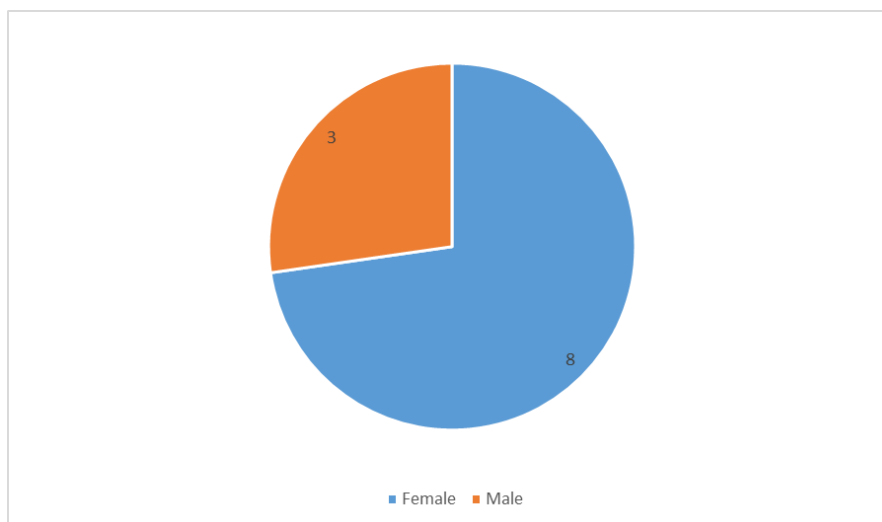
### 4.2. Phenomena in the learning process

The learning stages carried out are as follows:

- (i) In the first session, students seem enthusiastic about the test. Also, the students have a low level understanding.
- (ii) In the second session, the research process began with the making of the same pre-test and post-test questions in the form of a google form. The questions consist of ten numerical minimum competency assessment questions. The questions are in the form of multiple choice with four choices of answers and only 1 of the 4 choices has the correct answer.
- (iii) After the pre-test was done, students would take part in learning for at least 4 meetings to learn and practice the numerical minimum competency assessment questions.
- (iv) After the learning was completed, students would again be asked to work on post-test questions to see if there is an increase in students' numerical minimum competency assessment abilities after the numerical minimum competency assessment learning was carried out.

### 4.3. Data Analysis

**Table 1** shows the results of the students' pre-test and post-test scores in working on the minimum competency assessment questions. The same as research conducted by (Cahyanoviyanti & Wahidin, 2021) that the minimum competency assessment can be followed by students because students prefer minimum competency assessment questions, because they are easy to understand and can be found in everyday life so they can explore themselves in the process of learning mathematics.



**Figure 3.** Comparison of students'.

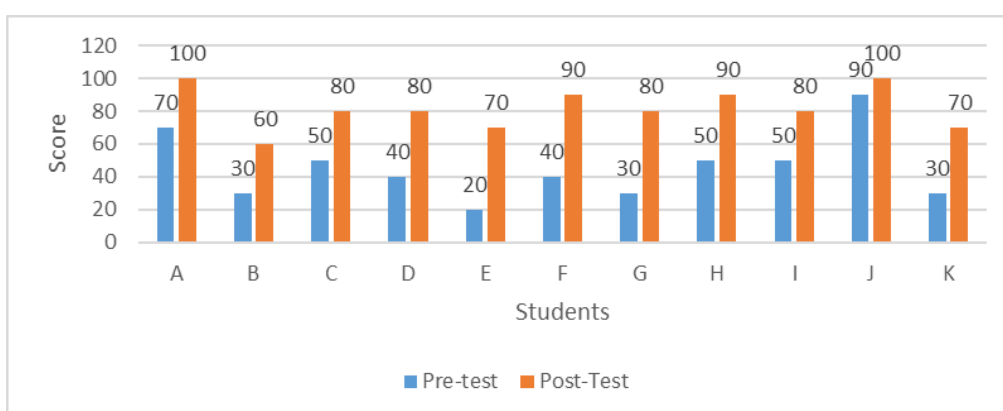
Students who get a final score of more than 70 at the time of the pre-test was as much as 9.00%. Then, after the students participated in learning for 4 meetings, the students who got a final score of more than 70 at the post-test were 72.72%. All students experienced an increase in scores. The comparison of pre-test and post-test scores can be seen more clearly in **Figure 4**. As we can see from **Figure 4**, that all students' grades eventually go up. It can also be seen that there are no students whose grades increase significantly.

There are a lot of factors that affect the increase in the value of students do not increase significantly. These factors include:

- (i) The research time span is quite short, which is only 4 meetings. This short time causes not all students can quickly apply knowledge quickly.
- (ii) Not all students have internet access to study independently through platforms that are already available or parents who can help with learning at home.
- (iii) Economic factors. Economic factors are very influential in the learning process. Not all students come from affluent circles. The lack of economics makes students unable to take paid additional lessons offline or online

**Table 1.** The results of the final pre-test and post-test minimum competency assessment.

Students	Pre-test Score	Post-test Score
A	70	100
B	30	60
C	50	80
D	40	80
E	20	70
F	40	90
G	30	80
H	50	90
I	50	80
J	90	100
K	30	70
<b>Total</b>	<b>500</b>	<b>900</b>



**Figure 4.** Comparison of the final scores of the pre-test and post-test of the numerical minimum competence assessment.



## 5. DISCUSSION

Minimum competence assessment is an assessment of the basic competencies needed by all students to be able to develop their own capacity and participate positively in society. There are two basic competencies measured by the minimum competency assessment, namely reading literacy and numeracy. The understanding of the minimum to show the size of what is owned by students can be viewed from reading literacy and numeracy which are competencies that at least must be possessed for someone to function productively in life (Hermiyanty & Bertin, 2017). However, this study only discusses numeracy skills.

Figure 5 shows that the minimum competency assessment places great emphasis on students' numeracy skills in the fields of content, cognitive processes and context. These three fields have the aim of making students have a higher level of thinking with various problems that exist in the questions, such as the purpose of the Minimum Competency Assessment, which is to measure competence at the individual level of students, which is expected that all students reach the level of proficient or proficient competence.

In this study, there were 11 students working on the Minimum Competency Assessment questions through a google form containing 10 questions. The results of the pretest showed that the level of numeracy ability of teacher junior high school students in the city of Bandung had an average of 45.45 out of 100, while the post-test had an average of 81.81 out of 100.

## 6. CONCLUSION

The conclusion of this research is that the numerical minimum competency assessment can increase students' interest in mathematics, because the number of students' learning interest scores has increased from 500 to 900. Although the increase is not significant because the research time can be said to be short and not all students can understand fast learning, numeric minimum competency assessment learning is quite effective to increase students' interest in mathematics. Therefore, we suggest the need for socialization of the meaning and usefulness of the numerical minimum competency assessment, so that students can understand it and the need for practice on numerical minimum competency assessment questions with various variations in the questions. Then the teacher is expected to pay more attention to the students to find out their numeracy skills to be ready to face the numerical minimum competency assessment questions. Suggestions for further was to make more varied numerical minimum competency assessment questions and focus on deeper numeracy abilities.

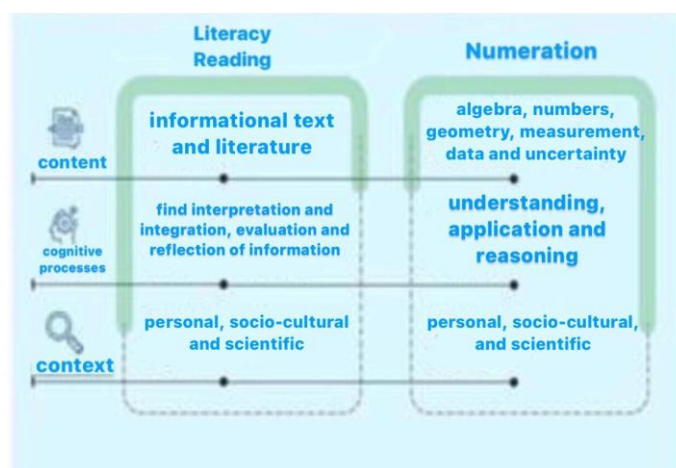


Figure 5. Minimum competency assessment components.



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## 8. AUTHORS' NOTE

We declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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