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DEVELOPMENT OF MATHEMATICS LEARNING METHODS THROUGH E-LEARNING MEDIA IN AMIR HAMZAH JUNIOR HIGH SCHOOL MEDAN

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ABSTRACT

Maths is one of the least popular subjects in schools. This research aims to develop an e-learning-based method of learning mathematics that is conducted through a network (computer network). The e-learning method in learning mathematics is intended to deliver a series of learning solutions that can attract learning interest, increase knowledge and skills. This research is a qualitative study that produces descriptive data with the research subjects being 30 students of SMP Amir Hamzah Medan class IX-b and 1 mathematics teacher who teaches in the class. The instrument analysis technique uses a validity test which is carried out to determine the level of measurement accuracy of an instrument used in a study. The results of the study are in the form of descriptive statistical test results with the ability of the characteristics of medium, high and low results based on self-assessment and peer assessment. The utilisation of e-learning can bring a new atmosphere in the development of learning to the maximum and can provide benefits such as shortening learning time and making study costs more economical, facilitating interaction between students and materials, students can share information with each other and can access learning materials at any time and repeatedly.

Keywords: Mathematics, E-learning, Junior High School Medan, Qualitative research

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INTRODUCTION

Mathematics is one of the exact subjects that has an important role in life. Mathematics is also a discipline that serves to study patterns of bonding, thoughts, art or language that are discussed logically to help in understanding social, economic and natural problems (Fidayanti and Shodiqin, 2020).

Mathematics itself at the junior high school (SMP) level is a lesson regulated by Permendikbud No. 21 of 2016 with the aim that students are able to show a logical, critical, analytical, careful, thorough, responsible, responsive and unyielding attitude in solving problems. In addition, Permendikbud No. 21 directs that students have an open, objective attitude in group and daily interactions, have the ability to communicate ideas clearly (Fahrurrozi and Hamid, 2017).

Nevertheless, maths is one of the least popular subjects in school. Students who receive mathematics tend to think that it is an unpleasant subject. In general, students tend to be less interested in the subject due to various views, such as inappropriate teaching methods, uninteresting learning methods and even negative views of the difficulty of mathematics that students often hear from others (Setyawati and Ratu, 2021).

Learning difficulties in mathematics experienced by junior high school students are usually caused by interference with one or more of the psychological processes that include understanding and using language or writing where the form of difficulty includes difficulty hearing, thinking, speaking, reading, writing, spelling and counting. Other difficulties experienced during learning mathematics are difficulty speaking and understanding symbols, difficulty interpreting problems, difficulty understanding concepts, difficulty calculating (Putri, 2018).

Meanwhile, according to Rahmah (2019) students' difficulties in learning mathematics are difficult to distinguish numbers and symbols, cannot remember mathematical postulates, write numbers in small sizes, are unable to read, write and understand mathematical symbols, have weak abilities in abstract thinking, have weak metacognition skills. Meanwhile, according to Jamaris (2016) the difficulty of students in learning mathematics is due to weakness when doing mathematical calculations, difficulty transferring knowledge, lack of understanding of mathematical language, difficulty related to visual perception.

One of the alternatives in overcoming the problems faced by junior high school students, especially Amir Hamzah Medan Junior High School students, related to the difficulty of learning mathematics is the existence of learning methods with e-learning media. This research aims to develop an e-learning-based mathematics learning method that is conducted through a computer network. The e-learning method in learning mathematics is intended to deliver a series of learning solutions that can attract learning interest, improve knowledge and skills.

E-learning-based mathematics learning is a learning process where students learn about mathematics material actively and independently. On the other hand, teachers teach and facilitate students to facilitate the learning process so that there is interaction between teachers and students (Fitriani and Nurjannah, 2019).

E-learning is a powerful tool that transforms traditional learning methods as it strengthens teaching and learning capacity. It provides interactivity and active learning that promotes collaboration and a variety of ideas between students and instructors. E-learning itself is more flexible and offers substitute learning of the traditional classroom model and is a process of enhancing study by gaining and supporting the distribution, of knowledge through various technological methods such as audio, chat, video conferencing and online discussions Mutiasari et al, 2019).

E-learning is an educational concept that utilises the development of information and communication technology, especially in the development of information and communication technology, especially in theteaching process. The ease of use of e-learning also lies in the fact that teachers can utilise more interesting media and learning resources to prepare for learning effectively, so they don't have to focus on printed books. print books. This can increase students' interest in learning when learning is no longer focussed on the teacher and the classroom (Rais, 2019).

METHOD

This research refers to the research of Ikrimah et al (2022) on the implementation of e-learning-based mathematics learning after the new normal era. This research is a quantitative study that produces data with the research subjects being 30 students of Amir Hamzah Medan Junior High School class IX-b and 1 mathematics teacher who teaches in the class. The object of research is strengthening character education in e-learning-based mathematics learning.

Before the observation technique using instrument analysis, initial observations were made by giving questionnaires to students about students' interest in learning mathematics and the level of difficulty faced by students. Based on the results of the questionnaire, it was found that the students of SMP AMir Hamzah Medan had a level of difficulty in understanding mathematics learning of around 75% (finding it difficult to understand mathematics). While the remaining 25% stated that understanding mathematics is acceptable but on certain chapter titles it is difficult to understand. This is the basis for conducting research on e-learning to continue with instrument analysis techniques.

The instrument analysis technique uses a validity test which is carried out to determine the level of measurement accuracy of an instrument used in a study, because instruments that have high validity can produce accurate data. The validity test used is in the form of content or content by using Aiken's test with the following formula.

$$\text{CVI} = \frac{\sum s}{n(c-1)}$$

Decription :
CVI = rater agreement index
s = the score given by each rater minus the lowest score
n = the number of raters
c = the highest score or the number of score categories that can be selected

The validity test categories with Aiken's can be categorised as follows.

Table 1. Aiken's Test Categories

Validity	Category
CVI < 0.40	Low
0.40≤CVI<0.80	Moderate
CVI≥0.80	High

The data analysis technique used in the self-assessment scale is descriptive statistical data analysis technique. Meanwhile, the data analysis technique used in the interview guidelines for the management of strengthening character education is the data analysis technique according to Miles and Huberman (Ikrimah et al., 2022).

RESULTS AND DISCUSSION

A. Assessment Results Calculation of the Self-Assessment Scale Deployment Process

The results of the calculation of the distribution process of the self-assessment scale on Amir Hamzah Medan Junior High School class IX-b students were calculated using descriptive statistical tests using Microsoft Excel software. The descriptive statistical assessment scale test can be seen in Table 2 below.

Table 2. Descriptive Statistical Test Results of Self-Assessment Scale

Descriptive Statistics	
Mean	67.5
The standard deviation	1.2
Minimum	50
Maximum	80
Sum	762
Count	12

Based on descriptive statistical tests that have been carried out, statistical descriptions based on self-assessment obtained a minimum value of 50, a maximum value of 80, a total value of 762, an average mean of 67.5 and a standard deviation of 1.2. Descriptive statistical tests that have been obtained using the mean and standard deviation, obtained the category of character values based on the self-assessment scale. The following are the categories of character values based on the self-assessment scale.

Table 3. Character Values Based on the Self Rating Scale

Category	Score
Low	X<63
Moderate	63≤X≤76
High	X≥76

The character category values based on the self-assessment scale can be seen in the character value category graph. The graph can be seen in Figure 1 below.

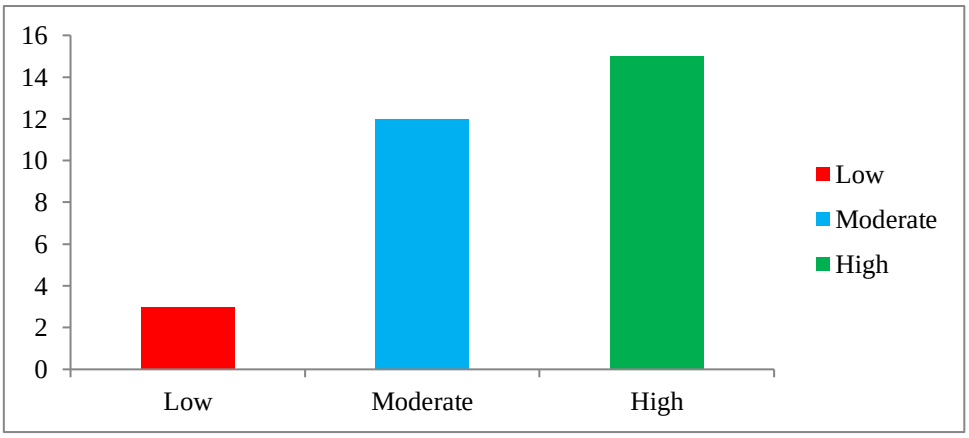

Figure 1. Graph of Character Value Categories Based on Self-Assessment Scale

Based on the table obtained, most subjects have low, medium and high categories, indicating that these subjects can carry out activities well because they have medium and high character value categories. Based on the graph of the character value category of the self-assessment scale that has been obtained, the subjects who have low categories are 2 people, medium categories are 20 people and high categories are 8 people. If the percentage of each character is calculated based on the rating scale, it can be seen in Table 4 below. It shows that most subjects have character values in the medium category (66.67%), others in the high category (26.67) and in the low category (6.67%).

Table 4. Character Value of Each Subject Based on Self-Assessment Scale

Category	F	%	Subject Code
Low	2	6.67	D, I
Moderate	20	66.67	B,C,F,G,H,K,L,M,N,P,Q,R,S,T,V,W,X,Y
High	8	26.67	A,E,U,O, J

B. Descriptive Statistical Test Results of Friend Assessment Scale

The results of the statistical assessment of peers were conducted after distributing the peer assessment scale. The results of the assessment used descriptive statistical tests conducted with the help of Microsoft Excel software. The results of the descriptive test can be seen in Table 5. Statistical descriptions based on peer assessment have a minimum value of 42, a

maximum value of 55, a total value of 562, a mean or average of 45.7 and a standard deviation of 3.2. From the results of the statistical test that has been obtained, scale scoring is carried out based on character values. The results of character values based on the peer assessment scale can be seen in Table 6.

Table 5 Descriptive Statistical Test of Peer Assessment

Descriptive Statistical	
Mean	45.7
The Standard Deviation	3.2
Minimum	42
Maximum	55
Sum	562
Count	11

Table 6 Character Value Categories Based on Friend Rating Scale

Category	Score
Low	X<44
Moderate	44≤X≤52
High	X≥52

After determining the category of character values based on the peer assessment scale, observations were made based on the graph of the character value category based on the peer assessment scale. The graph can be seen in Figure 2 below

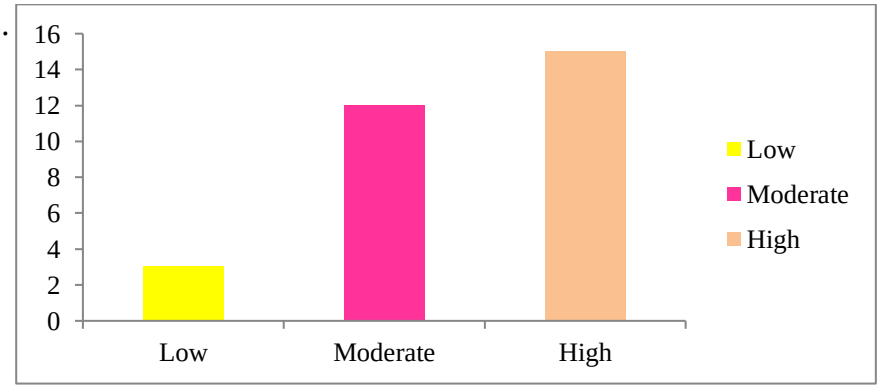

Figure 2. Graph of Character Value Categories Based on Friend Rating Scale

The graph shows that most of the subjects have medium and high categories, so this shows that the subjects can carry out the activities well because they have medium and high character value categories. Based on the value categories presented in the graph, it is obtained that the subjects who have low categories are 3 people, 12 people in the medium category and 15 people in the high category. If made in the percentage category of a friend's rating scale, it can be made in the form of Table 7. It shows that most subjects have a high category (50%), some have a medium (40%) and low category (10%).

Table 7. Character Value of Each Subject Based on Percentage of Peer Assessment

Category	F	%	Subject Code
Low	3	10	D, I,B
Moderate	12	40	B,C,F,G,H,K,L,M,N,P,Q,R
High	15	50	A,E,U,O, J, ,S,T,V,W,X,Y

The e-learning method can change students' interest in learning mathematics for the better and students' understanding in learning mathematics is also higher. based on the results of the mathematics test, it is also obtained that the results of learning mathematics using the e-learning method can change students' test results for the better. Based on the results of descriptive statistical tests that have been carried out, statistical descriptions based on peer assessment have a minimum value of 42, a maximum value of 55, a total value of 562, a mean or average of 45.7 and a standard deviation of 3.2. Based on the table obtained, most subjects have low, medium and high categories, indicating that these subjects can carry out activities well because they have medium and high character value categories. Based on the graph of the character value category of the self-assessment scale that has been obtained, the subjects who have low categories are 2 people, medium categories are 20 people and high categories are 8 people.

E-learning learning activities in mathematics learning have three stages of activities, namely (a) the planning stage of strengthening e-learning-based character education (providing opportunities for students to systematically identify and assess and develop e-learning in mathematics problem solving. (b) the implementation stage of e-learning learning activities can run smoothly as evidenced by the character value category generated from the self-assessment scale score and assessment from friends. (b) the evaluation stage of the results that have been achieved in implementing e-learning-based mathematics learning reinforcement. At the stage of evaluating the results, there are few obstacles in the form of students' lack of understanding of the concept of developing e-learning-based mathematics learning so that the role of teachers who have good enough competence in integrating mathematics lessons is needed. Another obstacle is that there are still some students who are indifferent and do not have self-awareness to follow the e-learning-based learning programme in developing mathematics learning.

The characteristics of e-learning are divided into three characteristics, including (a) utilising electronic technology services where teachers and students, students and fellow students or teachers and fellow teachers can communicate relatively easily without being limited by protocol, (b) using self learning materials that are stored on computers so that they can be accessed by teachers and students anytime and anywhere if they need it, (c) utilising learning schedules, curriculum, learning progress results and matters relating to educational administration can be seen at any time on the computer.

Hartono (2016) states that in e-learning there are five important things as requirements for learning activities, including (1) learning activities are carried out through the use of networks, in this case limited to the use of the internet, (2) the availability of learning service support that can be utilised by learners, (3) the availability of tutor service support that can help learners when experiencing difficulties, (4) institutions that organise and manage e-learning activities, (5) positive attitudes from students and education personnel towards Kemouter and internet technology.

Mutiasari et al (2019) stated that e-learning communication can be done in two ways, namely synchronous and asynchronous types. Synchronous means synchronisation which is a type of learning process where teachers teach and students learn at the same time. It allows direct interaction between teachers and students through the internet. Synchronous requires the teacher and all students to access the internet at the same time. Whereas asynchronous means not at the same time. This type of asynchronous learning is more popular in the world of e-learning as it provides more benefits to students as they can access learning anytime and anywhere.

E-learning in learning mathematics can be used as a medium for in-class learning or as a medium for independent learning. Classroom learning can help bring context into the

classroom to be addressed to students through the use of visual or audiovisual media. Applying mathematical concepts without having to see them directly, the use of media allows students to start thinking abstractly at the beginning. In addition to learning mathematics at a higher level, the concept of e-learning can improve higher order thinking skills and interest in learning mathematics. If you look at the characteristics of mathematics, certain materials are actually very necessary, because in more complex cases the calculations are done manually (Fitriani and Nurjannah, 2019).

CONCLUSION AND SUGGESTIONS

E-learning development is a web-based learning that becomes one of the school alternatives in the learning process. The utilisation of e-learning can bring a new atmosphere in the development of learning to the maximum and can provide benefits such as shortening learning time and making study costs more economical, facilitating interaction between students and materials, students can share information with each other and can access learning materials at any time and repeatedly. After obtaining conclusions from this study, it would be useful if teachers further develop learning media so that student learning outcomes can be even better from year to year.

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