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MATHEMATICS EDUCATION LEARNING AND TEACHING

The Effectiveness of the ASSURE Learning Model Assisted by Google Classroom in Improving Students' Mathematical Literacy in Transformational Materials

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a r t i c l e i n f o	**a b s t r a c t**
How to cite this article:	In theory, the Google Classroom-assisted ASSURE learning model can improve students' mathematical literacy in learning mathematics because the Google Classroom-assisted ASSURE learning model can be adapted to the material to be delivered to students, student conditions, available resources and competencies that students can master. The purpose of this study was to determine the effectiveness of the google classroom-assisted ASSURE learning model in increasing students' mathematical literacy. This study used a quantitative method using a Pretest-Posttest Control Group Design with a population of class IX students at SMPN 1 Gempol. The sample of this research was class IX D as the experimental class and class IX B as the control class which were selected through cluster random sampling technique. Learning process data were obtained using implementation observation sheets while students' mathematical literacy data were obtained through students' mathematical literacy tests and questionnaires. The results of data analysis show that the ASSURE learning model assisted by Google Classroom is effective in increasing students' mathematical literacy.

INTRODUCTION

Education has an important role in the development and change of the nation towards a better one. The 21st century school education has a learning paradigm that focuses on critical thinking, relates science to everyday life, masters information technology, and is able to communicate and collaborate well. One of the goals of learning mathematics is to prepare to be able to apply mathematics in everyday life, because mathematics is present in all aspects of life.

Students are expected to posssess five abilities in learning mathematics, namely mathematical problem solving, mathematical communication, mathematical reasoning, mathematical connections and mathematical representations (Puspaningtyas & Ulfa, 2020). These five abilities in learning mathematics are called mathematical literacy. The level of students' mathematical literacy skills in Indonesia is at level 1, this is known from the PISA results (Mansur, 2018). In 2012 Indonesia was ranked 64th out of 65 countries with an average international score of 494, in 2015 Indonesia was ranked 69th out of 76 countries with an average international score of 403 and in 2018 Indonesia was ranked 3rd 73 out of 78 countries (Masfufah & Afriansyah, 2021).

This shows that Indonesian students still have a very low ability to solve problems, reason, communicate, solve and interpret various problems in the form of learning problems. For this reason, in learning mathematics an innovative learning model is needed for students so that students are not bored and monotonous when learning is in progress. One learning model that can be used to improve mathematical literacy is the ASSURE learning model. This is in line with 21st century learning, that the learning process must be able to take advantage of existing technological and information opportunities. Thus, the use of technology through google classroom can support and facilitate students in learning mathematics so that mathematical literacy can increase with the technology-based ASSURE learning model, namely using google classroom. For this reason, researchers are interested in knowing the effectiveness of the ASSURE learning model assisted by the goggle classroom in increasing students' mathematical literacy in transformation material.

In this study, the authors put forward a hypothesis that is $H_0 : \mu_1 \leq \mu_2 = $ The effectiveness of the ASSURE model assisted by Google Classroom is smaller or the same as the ASSURE model for increasing students' mathematical literacy. $H_a : \mu_1 > \mu_2 = $ The effectiveness of the google classroom-assisted ASSURE model is better than the ASSURE model in increasing students' mathematical literacy.

LITERATURE REVIEW/ THEORETICAL FRAMEWORKS (IF APPLICABLE)

ASSURE Learning Model

The learning model is a conceptual design that describes ways with a systematic arrangement in organizing the learning process in the hope that learning objectives can be conveyed (Octavia, 2020). The ASSURE learning model is a learning model developed with a focus on lesson plans to create effective and efficient learning experiences, especially learning experiences that use media and technology (Iskandar & Farida, 2020). The ASSURE learning model stands for Analyze learners characteristics, State standards and objectives, Select methods, media, and materials, Utilize materials, Require learner participation, Evaluate and revise.

Analyze learners characteristics. The first step taken in applying the ASSURE learning model is to find out the characteristics of students who carry out learning activities (Fahriansyah, 2021). An understanding of student characteristics includes several important aspects, namely (a) general student characteristics such as age, social class, occupation and gender, (b) special qualifications previously held by students, (c) student learning styles such as auditory, visual, and kinesthetic. State standards and objectives (determining standards and learning objectives). The learning objectives achieved by students can be obtained through the syllabus, information contained in textbooks or made by the teacher himself. Learning objectives are formulations that describe the knowledge, skills and attitudes acquired by students after participating in learning activities (Fahriansyah, 2021).

Select methods, media, and materials. There are three steps in this process, namely deciding what method is appropriate to use in learning activities to give assignments to students, determining the learning media to be used to apply the previously selected method and choosing, developing and designing material specifically (Sundayana, 2019). *Utilize materials* The fourth step in this process is the use of selected methods, media and teaching materials in the learning process (Fahriansyah, 2021). Preferably, before using these three components the teacher must first conduct an experiment to ensure that these components work effectively in learning activities.

Require learner participation. The teacher provides opportunities for students to actively participate in the learning process activities (Sundayana, 2019). In class activities, students individually or in groups pay attention to ongoing learning. *Evaluate and revise.* There are several objectives of the evaluation which is used to assess student performance as well as for evaluating media and methods (Sundayana, 2019).

Google Classroom

Google classroom is an LMS (Learning Management System) service platform developed by Google for schools and other educational institutions, to make it easier to create, distribute and assign assignments in a simple way because they don't use paper (Imaduddin, 2018). Google classroom is an online learning platform that can be used to make it easier for teachers and students to carry out learning activities flexibly without being constrained by distance and time.

There are various Google Classroom features that can be used to maximize literacy skills (Hapsari & Pamungkas, 2019). Optimizing various google classroom features has a major impact on learning in the digital era as it is today, including that the technology-based learning process takes place online, is flexible, by utilizing the internet students can be directly involved in learning activities, students have easy access to the learning materials provided by educators and data literacy and technology literacy is increasing (Sholeh, Murtono, & Masfuah, 2021).

Mathematical literacy

Mathematical literacy is an individual's ability to formulate, apply and interpret mathematics in various situations (Afriyanti, Wardono, & Kartono, 2018). Mathematical literacy is an individual's ability to formulate, explain and apply the role of mathematics in everyday life so that it can improve students' skills and abilities in solving problems. This form of mathematical literacy is not just about understanding the material. Rather it involves mathematical reasoning and the use of mathematical concepts, stages, facts and tools in predicting an event.

The form of assessment of mathematical literacy according to PISA includes seven main components, namely *Communicating, Mathematising, Representation, Reasoning and argument, Devising Strategies for Solving Problems, Using Symbolic, Formal and Technical Language and Operation, Using Mathematics Tools* (OECD, 2013). There are several indicators that someone can be said to have mathematical literacy. The indicators for measuring mathematical literacy are as follows (Saputri, Sari, & Ayunda, 2021). Formulate real problems in problem solving, use mathematics in problem solving, interpret solutions in problem solving, and evaluate solutions in problem solving.

Transformation Material

Geometry transformation is a branch of geometry that discusses changes in the position or shape of geometric objects as a result of a shift, reflection, rotation and scale change (Marsigit, Himmawati, Karyati, & Sugiman, 2008). The material for transformation is divided into four sub-chapters, namely translation, reflection, rotation and dilation.

METHODS

Population and Sample

The population for this study comprised ninth-grade students at SMPN 1 Gempol during the 2022/2023 academic year consisting of 9 classes. The sample used in this study were two classes, namely one used as the control class and one used as the experimental class. The sampling technique used the cluster random sampling technique, in order to obtain class IX B as the control class and class IX D as the experimental class.

Reseach Design

This research uses quantitative methods. The research design used in this study was a Quasy Experiment design using a Pretest-Posttest Control Group Design. Data collection techniques used were questionnaires (student response questionnaires and mathematical literacy questionnaires), mathematical literacy tests and implementation observation sheets.

Reseach Instrument

In this study the research instruments used were questionnaires (student response questionnaires and mathematical literacy questionnaires), implementation observation sheets and mathematical literacy tests. Student response questionnaires were distributed to students to find out the responses of students after carrying out learning activities using the ASSURE learning model assisted by Google Classroom consisting of 17 statement items with five answer choices, namely strongly disagree (STS), disagree (TS), doubt. - doubt (R), agree (S) and strongly agree (SS). Mathematical literacy questionnaires were distributed to students with the aim of knowing the increase in students' mathematical literacy consisting of 14 statement items with five answer choices, namely strongly disagree (STS), disagree (TS), undecided (R), agree (S), and totally agree (SS).

The implementation observation sheet is used to determine the practicality value of a learning tool that has been developed and the mathematical literacy test is used to determine students' mathematical literacy. The implementation observation sheet consists of 12 statements with five possible answers, namely very practical (5), practical (4), quite practical (3), less practical (2) and very impractical (1).

Test questions are used to determine students' mathematical literacy, these questions are in the form of descriptions consisting of 5 items which are arranged based on indicators of

mathematical literacy, namely formulating real problems in problem solving, using mathematics in problem solving, interpreting solutions in problem solving and evaluating solutions in problem solving.

The data analysis technique used in this study is a quantitative data analysis technique. There are several analyzes in quantitative data, questionnaire analysis and test analysis (pretest and posttest) using prerequisite tests in the form of normality tests and homogeneity tests, N-Gain tests and independent sample t-tests. To obtain a good test, the test is tested first to determine its validity, reliability, distinguishing power and level of difficulty. This trial test was carried out on class IX A students of SMPN 1 Gempol in the even semester of the 2022/2023 academic year, which consisted of 30 students who were not a research sample.

The test results of the students' mathematical literacy test instrument showed that all test items were valid and could be used to obtain mathematical literacy data with a reliability of 0.785, which was included in the high category. The level of preference for the questions consisted of 5 moderate questions and all questions had a distinguishing power of 3 very good questions and 2 good questions. Meanwhile, the results of the questionnaire trial showed that all statement items were valid and could be used to obtain mathematical literacy data with a reliability of 0.812, which was included in the high category.

RESULT AND DISCUSSION

Description of test result

Based on the results of the pretest and posttest that have been carried out for the experimental class and the control class, it was found that the ASSURE learning model assisted by Google Classroom can improve students' mathematical literacy in transformation material.

Data Analyze

To find out the effectiveness of the ASSURE learning model assisted by Google Classroom in increasing students' mathematical literacy, it is necessary to carry out statistical tests. Previously, the normality test and homogeneity test were carried out on the data first.

Normality Test

The normality test is carried out with the aim of knowing whether the data is normally distributed or not normally distributed. In this study the normality test used was the Shapiro Wilk test by taking a significance level (α) of 0.05.

From the results of calculations using SPSS V.25, the following data is obtained:

Table 1
Normality Test

		Tests of Normality					
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Kelas	Statistic	Df	Sig.	Statistic	Df	Sig.
Ngain_Score	Kontrol	0.126	32	0.200*	0.950	32	0.146
	Eksperimen	0.076	30	0.200*	0.959	30	0.288
*. This is a lower bound of the true significance.							
a. Lilliefors Significance Correction							

Based on the table above, it can be seen that the experimental class and control class data tested using the Shapiro-Wilk test with a significance level of 5% are normally distributed data because in the control class a significance value of 0.146 means that the sig value > 0.05, it can be drawn the conclusion that the mathematical literacy test meets the requirements or can be said to be normally distributed because the value of the control class is sig > 0.05.

Homogeneity Test

The purpose of using the homogeneity test is to find out whether some of the data variants in the study are the same or not. The statistical test used is Levene's test with a significance level of 5%. From the results of calculations using SPSS V.25, the following data is obtained:

Tabel 2
Homogeneity Test

Test of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
Ngain_Score	Based on Mean	1.289	1	60	0.261
	Based on Median	1.233	1	60	0.271
	Based on Median and with adjusted df	1.233	1	55.248	0.272
	Based on trimmed mean	1.240	1	60	0.270

Based on the table above, it can be seen that the results of the homogeneity test using the Levene test method with a significance level of 5% obtained sig values of 0.261, 0.271, 0.272, 0.270, which means greater than 0.05 (> 0.05). So it can be concluded that the mathematical literacy test meets the requirements or can be said to be homogeneous because the sig value is > 0.05.

N-Gain Test

The purpose of carrying out the N-Gain test is to find out the increase in the effectiveness of the *ASSURE* learning model assisted by *Google Classroom* to increase mathematical literacy. In this study, to determine the increase in students' mathematical literacy, researchers conducted tests in the form of descriptions on the transformation material before students participated in learning activities (pretest) and after students participated in learning activities (posttest). The number of essay tests given to students was 5 material questions. transformation.

The result of the calculation of the N-Gain test for the experimental class was 0.77 including high criteria while the result of the calculation of the N-Gain test for the control class was 0.37 including medium criteria. Thus, it can be concluded that the use of the *ASSURE* learning model assisted by *Google Classroom* is included in the high category for increasing mathematical literacy in transformation material.

Independent Sampel T-Test

After carrying out normality tests and homogeneity tests on students' mathematical literacy data on transformation material in junior high schools, the results showed that all data came from normal populations and had homogeneous variants.

To find out whether there are differences in the mathematical literacy test in the experimental class, namely class IX D and the control class, namely class IX B, a test was carried out with the following hypothesis:

Ho =   There is no significant average difference between mathematical literacy and the pretest and posttest of students from the experimental class and the control class. This means that there is no effect on the use of google classroom media on the ASSURE learning model in increasing mathematical literacy.

Ha =   There is a significant average difference between mathematical literacy and the pretest and posttest of students from the experimental class and the control class. This means that there is influence in the use of google classroom media on the ASSURE learning model in increasing mathematical literacy.

The basis for making a decision on the independent sample t-test is as follows.

1. the value of sig.(2-tailed) < (0.05), then H0 is rejected and Ha is accepted.
2. If the value of sig.(2-tailed) ≥ (0.05), then H0 is accepted and Ha is rejected.

From the calculation results obtained a p-value (Sig) of 0.000 <0.05, then Ho is rejected and Ha is accepted. In other words, there is a significant average difference between mathematical literacy and the pretest and posttest of students from the experimental class and the control class. This means that there is influence in the use of google classroom media on the ASSURE model in increasing mathematical literacy.

Students' Mathematical Literacy and Response

The questionnaire used in this study was a student response questionnaire using the *ASSURE* learning model and a mathematical literacy questionnaire. Student response questionnaires were distributed to the experimental class, namely class IX D with the aim of knowing student responses to the ASSURE learning model assisted by *Google Classroom*. The student response questionnaire consists of 17 statements with indicators namely interest, implementation and conclusions. The results of the student response questionnaire recapitulation are as follows:

Tabel 3. recapitulation of student response questionnaires

Indicator	Percentage	Category
Interest	63,17%	Good
Implementation	62,67%	Good
Implementation	70,50%	Good
Conclusion	81,73%	Very Good
Average	70%	Good

Based on the table above, it can be concluded that of the 4 indicators that have been described, they are in the good category with an average of 70%. This indicates that student responses to the ASSURE model assisted by Google Classroom to improve mathematical literacy can be said to be good.

Mathematical literacy questionnaires were distributed to the control class and the experimental class twice with the aim of knowing students' mathematical literacy before and after carrying out learning activities. The mathematical literacy questionnaire consists of 14 statements consisting of 4 indicators. The distribution of the first questionnaire was carried out before the learning activities with the following recapitulation results:

Tabel 4
Recapitulation of Mathematical Literacy Questionnaire

Indicator	Percentage	Category
Formulate real problems in problem solving	80%	Good
Using mathematics in problem solving	70,67%	Good
Interpret solutions in problem solving	68,17%	Good
Evaluate solutions in problem solving	79,11%	Good
Average	74%	Good

Based on the table above, it can be concluded that of the 4 indicators, they are in the good category with an average of 74%. This indicates that mathematical literacy before learning can be said to be good.

The distribution of the second questionnaire was carried out after the learning activities with the following recapitulation results:

Tabel 5
Recapitulation of Mathematical Literacy Questionnaire

Indicator	Percentage	Category
Formulate real problems in problem solving	85,50%	Very Good
Using mathematics in problem solving	82%	Very Good
Interpret solutions in problem solving	82,50%	Very Good
Evaluate solutions in problem solving	80%	Good
Average	83%	Very Good

Based on Table 4 and Table 5 the results of the recapitulation of students' mathematical literacy questionnaire with an initial average of 74% which has good criteria and the final average is 83% which has very good criteria. It can be concluded that there is an increase in students' mathematical literacy with the ASSURE model assisted by Google Classroom in learning.

Performance Obervation Sheet

In this study, the results and data analysis of the implementation of the Google Classroom-assisted ASSURE model to increase mathematical literacy with an average assessment of the results of observations of the implementation of lesson plans for meetings 1-2 are as follows.

Tabel 6
Tabulation of Data Observation Sheet Performance

Meeting	Rated Aspect												Total
	1	2	3	4	5	6	7	8	9	10	11	12	
1	5	5	3	5	5	4	3	3	4	5	4	5	51
2	5	5	3	5	5	4	4	4	4	5	4	5	53
Overall Score													104

The results of the percentage per learning meeting using the ASSURE learning model assisted by Google Classroom are as follows:

$$k = \frac{51}{60} \times 100\% = 85\%$$

$$k = \frac{53}{60} \times 100\% = 88\%$$

So, the average percentage of the two is as follows.

$$k = \frac{\text{pertemuan 1 + pertemuan 2}}{2}$$

$$k = \frac{85\% + 88\%}{2}$$

$$k = 86{,}5\%$$

Based on the calculations that have been made above, it can be seen that the percentage of the implementation of the ASSURE model learning assisted by Google Classroom to increase students' mathematical literacy is 86.5% with the criteria being well implemented.

CONCLUSION AND IMPLICATION

Conclusion

Based on the results of research and discussion regarding the effectiveness of the google classroom-assisted ASSURE learning model in increasing students' mathematical literacy in transformation material, it can be concluded that the google classroom-assisted ASSURE learning model to improve students' mathematical literacy in transformation material can be said to be effective.

Implication

Based on the conclusions above, the authors put forward some suggestions as follows:
1. For Teachers
   Teachers can take advantage of learning media in the form of google classroom media in learning mathematics transformation material
2. For Students
   The ASSURE model assisted by Google Classroom is expected to increase mathematical literacy and can be used in independent learning.
3. For Schools
   The ASSURE model assisted by Google Classroom can be used as input in preparing school quality improvement programs.

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