

An Instrument to Test Students' Mathematical Literacy Skills in Geometry Plane Figures Based on Malay Culture

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Abstract. Cultural context is rarely used in learning mathematics. In cultural education, it has become one of the goals of mathematics education that education is both a form and a product of culture. The purpose of this study is to understand the design of an instrument to test students' mathematical literacy skills in c based on Malay culture and to analyze students' mathematical literacy skills of students based on Malay culture. This study follows descriptive qualitative research. The sample of this study includes students of XII MA Private Hj. Siti Julia Secanggang, Langkat. Test validity, test reliability, level of difficulty, and discriminating power were declared feasible by using the SPSS program. Expert validation was carried out by lecturers in the mathematics education study program and teachers in the field of mathematics studies. It was found that the instrument for testing students' mathematical literacy skills was valid in terms of content, language, and constructs. The results of the Malay culture-based students' mathematical literacy test results obtained an average score of 84.25 with the lowest score of 70 and the highest score of 95.

Keywords: Mathematical Literacy Ability Test, Malay culture, Geometri Plane Figure.

1 Introduction

Learning mathematics is an educational goal that must be achieved [1] (Simamora, 2011). As a goal, it is hoped that students can identify elements that are known, asked about and the adequacy of the elements needed, formulate problems from everyday situations in mathematics, apply strategies to solve various problems (similar and new problems) within or outside mathematics. To achieve mathematics learning goals, one of the abilities that students must master is mathematical literacy skills.

According to [2] (Muti'ah et al., 2020) Mathematical literacy does not only carry out procedures, it includes the knowledge base, competence and confidence to apply knowledge in the real

world. Those who look at mathematics can predict, interpret data, solve everyday problems, reason in numerical, graphical, and geometric situations, and communicate using mathematics. With the advancement of science everyone is working with technology. [3] (Darwanto, Mar'atun Khasanah, 2020). Mathematics is a technological foundation for problem solving and communication. Therefore, mathematical literacy is very important both at work and in everyday life. [4] (Winardi et al., 2018). Mathematical literacy skills and reading and writing skills are equally important.

According to [5] (Koentjaraningrat, 2018) says that culture is the entire system of ideas and feelings, actions and works produced by humans in social life which they make their own by learning. According to [6] (Rizqi et al., 2022) Education and life is the link between the process of using content, especially the process of taking over culture in the sense of human civilization. Another aspect of the functional origin of education is the transformation of this culture into attitudes, mental behavior and even into student personality, while the foundation of education is philosophy. In this mathematics learning, Malay culture is used which is associated with mathematical literacy skills [7] (Fajriyah, 2018).

From the results of the first interview with teachers and students at HJ Private MA. Siti Julia Secanggang, especially in the field of mathematics, is that students are still not capable of solving mathematical problems in the context of literacy in mathematics, therefore the process of learning mathematics must be carried out properly with the ability to think systematically, logically, creatively and disciplined, so learning mathematics can function to develop abilities. creative by providing ideas and ideas for solving in various ways and even solving in more than one way [8] (Purwasih et al., 2018).

2 Method

This research is a qualitative descriptive study which was carried out from 3 October to 15 October 2022 at MAS Hj. SITI JULIA SECANGGANG in class XII by knowing the ability of mathematical literacy in students and to find out the design of instruments for testing the ability of students' mathematical literacy based on Malay culture material geometric shapes and analysis of students' mathematical literacy skills based on Malay culture [9] (Julizal et al., 2021).

Data collection in this study was carried out by administering a written test, the test used in this test was the posttest test (final test). The mathematical literacy ability test instrument used in this study is a subjective type test in the form of essay questions. The number of questions given is 5. The test given is about flat shapes. Before the instrument for testing mathematical literacy abilities was used in this study, the instrument was first tried out with the aim of getting an overview of whether or not the requirements of the instrument as a data collection tool were fulfilled. Based on the statement above, what is included in the context of Malay culture which is applied in learning mathematics in this study is the teaching material for rectangular flat shapes in the form of material culture in the form of betel palm which is a distinctive heritage of Malay culture.

However, in reality, the ability of mathematical literacy in Malay culture has never been applied in teaching mathematics at schools. In learning mathematics with mathematical literacy skills

can help students reason mathematically and be able to formulate, apply, and interpret in solving problems in various real contexts based on everyday life related to Malay culture.

In mathematics learning Malay culture there are various learning resources that can be used as learning resources consisting of textbooks and also electronic textbooks, culture-based student worksheets (LKS) and also culture-based multimedia [10] (Dek Ngurah Laba Laksana, 2021).



Figure 1. Tepak Sirih

3 Results and Discussion

A good question must meet validity, reliability, level of difficulty, distinguishing power, and distractor effectiveness [11] (Ardhani, 2020)

The results of calculating the validity of tests of students' mathematical literacy skills based on Malay culture can be seen in the following table:

Table 1. Test of students' mathematical literacy ability

		s1	s2	s3	s4	s5	jlh
s1	Pearson Correlation	1	.570**	.264	-.080	-.149	.611**
	Sig. (2-tailed)		.002	.183	.690	.457	.001
	N	27	27	27	27	27	27
s2	Pearson Correlation	.570**	1	.279	.039	.043	.681**
	Sig. (2-tailed)	.002		.159	.846	.833	.000
	N	27	27	27	27	27	27
s3	Pearson Correlation	.264	.279	1	.126	.049	.572**
	Sig. (2-tailed)	.183	.159		.530	.810	.002
	N	27	27	27	27	27	27
s4	Pearson Correlation	-.080	.039	.126	1	.220	.458*
	Sig. (2-tailed)	.690	.846	.530		.270	.016

	N	27	27	27	27	27	27
s5	Pearson Correlation	-.149	.043	.049	.220	1	.446*
	Sig. (2-tailed)	.457	.833	.810	.270		.020
	N	27	27	27	27	27	27
Jlh	Pearson Correlation	.611**	.681**	.572**	.458*	.446*	1
	Sig. (2-tailed)	.001	.000	.002	.016	.020	
	N	27	27	27	27	27	27

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Table 2. Calculation Results of the Validity of Students' Mathematical Literacy Ability Tests Based on Malay Culture

Test of students' mathematical literacy ability			
No	r_{count}	r_{table}	Information
1	0.611	0,381	Valid
2	0.681	0,381	Valid
3	0.572	0,381	Valid
4	0.458	0,381	Valid
5	0.446	0,381	Valid

Based on the results of the validity calculation of the Malay Culture Based Students' Mathematical Literacy Ability Test which was carried out by 27 students, it can be concluded that all students' mathematical literacy ability test questions have met adequate criteria for use in research.

The results of the reliability calculation of the Malay Culture Based Students' Mathematical Literacy Ability Test can be seen in the following table:

Table 3. Reliability Test

No	Variable	r_{count}	r_{table}	Information
1	Test of students' mathematical literacy ability	0,634	0,381	Reliable

The results of the calculation of the difficulty level of the Malay Culture-Based Students' Mathematical Literacy Ability Test can be seen in the following table:

Table 4. Difficulty Level of Students' Mathematical Literacy Ability Test Based on Malay Culture

		Statistics				
		s1	s2	s3	s4	s5
N	Valid	27	27	27	27	27
	Missin g	0	0	0	0	0
Mean		3.2593	3.5185	3.3704	3.4074	3.2593

Table 5. Difficulty Index Criteria

No	Difficulty Index	Information
1	0,300	Currently
2	0,322	Currently
3	0,314	Currently
4	0,292	Hard
5	0,288	Hard

The results of the calculation of the experimental class discriminating power can be seen in the following table:

Table 6. Distinguishing Power Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
s1	13.5556	1.718	.211	.356
s2	13.2963	1.755	.448	.188
s3	13.4444	1.949	.311	.290
s4	13.4074	2.097	.117	.418
s5	13.5556	2.103	.045	.486

Table 7. Distinguishing Power

NO	Test of students' mathematical literacy ability	
	Distinguishing Power	Information
1	0.356	Currently
2	0.188	Bad
3	0.290	Currently
4	0.418	Good
5	0.486	Good

Before researchers conduct research, researchers carry out expert validation first. Expert validation was carried out by lecturer in the Mathematics Education Study Program, FKIP UNIVA Medan, Mrs. Jihan Hidayah Putri, S.Pd. M.Pd, as validator 1 and Mathematics teacher MAS Hj. SITI JULIA SECANGGANG, Mrs. Rika Andriani S.Pd. The research instrument that has been validated is the Malay Culture-Based Student Mathematical Literacy Ability Test.

Table 8. Malay Culture Based Student Mathematical Literacy Ability Test Validation Sheet

No.	Validated indicators	Evaluation	
		1	2
1	Accuracy of selecting assessment techniques with indicators and learning objectives	4	5
2	Suitability of indicator instrument items and learning objectives	4	5
3	Availability of instructions on the question	5	5
4	Suitability of questions to the material being taught	5	5
5	Clarity of the purpose of the question	4	4
6	Good and correct use of Indonesian language rules	4	4
7	Ease of understanding the language used	4	4
Amount		30	32
Average		4,2	4,5
Rating Score		85%	91%
Category		Very worthy	Very worthy

Table 8 shows the validation results of the Malay Culture-Based Students' Mathematical Literacy Ability Test by validator 1 and validator 2 with very decent categories. However, there are comments and suggestions from the two validators so that the syllabus to be used must be revised first.

Based on the test results of 27 students, 2 students got a score of 70, 5 students got a score of 75, 4 students got a score of 80, 6 students got a score of 85, 4 students got a score of 90, 6 students got a score of 95. The results of the students' mathematical literacy ability test were based on Malay culture averaged a score of 84.25 with the lowest score being 70 and the highest score being 95.

4 Conclusions and Suggestions

Based on the results of data analysis and discussion that has been described previously, it can be concluded as follows.

1. Test validity, test reliability, level of difficulty and discriminating power using the SPSS program were declared suitable for use.
2. Expert validation was carried out by lecturers in the mathematics education study program and teachers in the field of mathematics studies and it was found that the instrument for testing students' mathematical literacy skills was valid in terms of content, language and construct.

3. It was obtained that the results of the mathematical literacy ability test for students based on Malay culture averaged a score of 84.25 with the lowest score being 70 and the highest score being 95.

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