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Relationship between Literacy and Numeracy for Junior High School

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ABSTRACT

The objective of the study was to examine the reading literacy and numeracy skills of Grade VII Junior High School pupils. This study employs a quantitative descriptive approach. The participants of this study consisted of 35 pupils. Explore methodologies for gathering research data through the utilisation of tests. The research instrument employed was a standardised assessment sheet designed to measure proficiency in reading literacy and numeracy skills. Both the reading literacy exam and the numeracy ability test encompass three cognitive levels. The employed data analysis technique involves calculating the mean value, conducting a regression test, and determining the coefficient of determination. The study findings indicate that the mean reading proficiency surpasses numeracy, however both remain suboptimal. These figures are demonstrated by the mean score of 60.46 on the reading exam and 33.71 on the numeracy test. There is a favourable association between literacy and numeracy ability, which is somewhat interpreted. The proficiency in reading and writing has a significant impact on one's capacity to perform mathematical calculations, accounting for a substantial proportion of 16.8%. The remaining portion is influenced by several other elements. The findings of this study suggest that teachers should incorporate AKM questions into their teaching practices to help students develop a habit of reading and comprehending questions. It is anticipated that this approach will lead to a substantial improvement in students' literacy and numeracy scores.

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1. INTRODUCTION

The curriculum and other aspects of Indonesian education have undergone revisions and adaptations since the COVID-19 epidemic. The goal of these modifications is to mitigate the effects of student learning loss and restore learning during a pandemic. With each lesson, new ideas for curricular reform were implemented, building on previous ones such as the 2013 curriculum, the reduced emergency 2013 curriculum, the prototype curriculum, and finally, the independent

curriculum. The shift towards better learning, which was once only done in schools, can now be planned in the comfort of anyone's home thanks to the fact that it is both project-based and digitally based. As stated in Ministerial Regulation No. 5 of 2022 (Lie et al., 2022) and similar regulations in other nations, the overall goal of the curriculum revisions is to enhance students' basic education literacy and numeracy abilities. Economic success, higher per capita income, and high competitiveness are all outcomes of individuals with strong literacy and numeracy skills.(Wendisch, 2016)

Literacy, according to Posel (2011), is defined as the ability to read and write. Literacy has expanded beyond the traditional boundaries of reading and writing as society has progressed. Reading critically, analytically, and reflectively is now considered an essential skill for literacy (Sari, 2018). Achieving and maintaining a high level of literacy is an essential skill for success in the modern world (Nudiati & Sudiapermana, 2020). Literacy in reading, writing, speaking, listening, and understanding is the foundational skill for all other forms of basic literacy, including scientific, numerical, financial, cultural, citizenship, and digital literacy.This is according to Desyandri (2018). Reading and numeracy are the two components of basic literacy that this piece aims to address. Achieving high-quality education across the board hinges on students' ability to read, write, and do basic maths (Wyatt-Smith et al., 2011). For education to be effective in the modern era, it must equip students with the following abilities: the capacity to learn and innovate, proficiency in the use of various forms of digital media, the capacity to work and survive in a variety of contexts, literacy in recognising and evaluating information for relevance and appropriateness, and numeracy in solving problems pertaining to one's own life, one's local community, and the world at large (Naibaho, 2022).

According to Karaali et al. (2016), there are four parts to numerical competence: skill, knowledge (in the areas of mathematics, arithmetic, and logic), competence, and context (in real-world scenarios). For instance, in social arithmetic, word problems are a common way to communicate maths issues, demonstrating a correlation between literacy and numeracy (Purpura et al., 2011). In this instance, the right solution requires knowledge of reading tale issues. Numeration is the skill of solving real-world problems using numerical and symbolic representations, as well as analysing data presented in a variety of formats (e.g., charts, tables, graphs, etc.) and interpreting the findings to draw conclusions and make decisions. It encompasses the capacity to recognise, comprehend, and apply numerical assertions in a variety of everyday situations (Adeyemi & Adaramola, 2014). Number theory is a subfield of mathematics, but not the other way around. Beyond reading, writing, and arithmetic, numeracy encompasses a wider range of literacy skills. Figure 1 below provides an explanation of numeracy in mathematics.

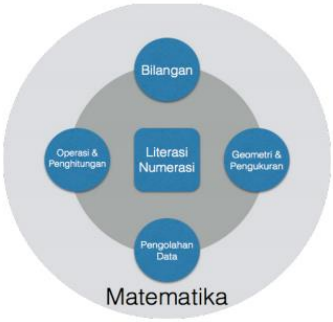

Figure 1. Scope of Numerical Literacy in Mathematics

The scope of numeracy literacy in mathematics as shown in Figure 1 is included in the 2013 curriculum. This is in line with the 2017 Ministry of Education directives, that the basic principles of numeracy literacy include being aligned with the scope of the 2013 curriculum subjects, contextual, and enriching other literacy elements. Numerical literacy skills must be owned by everyone so that they can make a real contribution to social, economic growth and welfare for the individual himself and society.

However, in reality, both the literacy and numeracy abilities of students in Indonesia are still low. In the reading ability category, Indonesia is ranked 74th while in the mathematics category, Indonesia is ranked 73 out of 79 countries (OECD, 2019). Indonesia is a country that has very low numeracy literacy skills, compared to countries in Southeast Asia(Ambarwati & Kurniasih, 2021). Based on data fromhttps://rapordikbud.kemdikbud.go.id/appin the city of Cirebon, for the junior high school level the result was that students' numeracy skills were still not as expected. From 2010 the number of respondents from 69 educational units obtained the result that less than 50% of students had reached the minimum competency limit for numeracy and efforts needed to be made to encourage many students to become proficient in literacy. The 2022 public education report card is based on assessments in the AKM which are grouped into 2 categories including Literacy and Numeracy.

Several studies related to literacy and numeracy have been carried out.(Mahmud & Pratiwi, 2019)researching numeracy literacy in solving unstructured problems in primary schools. Furthermore, analysis of literacy and numeracy skills has been studied at the elementary school level(Harahap et al., 2022; Rahmawati, 2021), middle school level(Ate & Lede, 2022; Pulungan, 2022; Rosidi et al., 2022)and high school(Puspaningtyas & Ulfa, 2020; Winata et al., 2021). (Rothman & McMillan, 2003) Examining what factors influence the literacy and numeracy skills of junior high school students in Australia. (Chapman & Lee, 1990) assumes that literacy and numeracy are represented as different and independent skills. Based on the results of previous research, the researcher wants to prove quantitatively whether there is a link between literacy and numeracy in junior high school students. However, research that looks at the influence of literacy skills on numeracy of junior high school students and determines how big the effect is has not been studied. Therefore this study aims to reveal the effect of literacy skills on numeracy and determine how big the effect is.

2. METHODS

The research employed a quantitative methodology utilising ex post facto research approaches. The participants in this study consisted of seventh-grade pupils from a junior high school in Cirebon. The selection technique employed in this study is simple random sampling, which involves randomly selecting samples from the population without considering any strata within the population (Sugiyono, 2016). Prior to conducting the research, discussions were held with mathematics and Indonesian language teachers to ensure that the samples utilised had similar student characteristics and were taught using the same curriculum. The research instruments consisted of three numeracy essay questions and twenty-five multiple choice questions derived from the Ministry of Education and Culture's National Literacy Movement (GLN) website's Minimum Ability Assessment. The literacy assessment measures cognitive abilities such as knowledge retrieval, comprehension, critical analysis, and introspection. The numerical cognitive level being examined encompasses knowledge, application, and reasoning. Before implementation, the literacy and numeracy questions underwent rigorous testing to assess the quality of the questions. This involved evaluating their validity, reliability, differentiating power, and index of difficulty. Data analysis procedures employ inferential statistics, which involve doing normality tests, regression testing, and determination. The hypotheses in this study are as follows:

This analysis is used to test the research hypothesis. The hypothesis that the author proposes is as follows:

H_0 : There is an influence between literacy skills on the numeracy abilities of junior high school students

H_a : There is no influence between literacy skills on students' numeracy abilities of junior high school students

3. FINDINGS AND DISCUSSION

This research was carried out in October 2022 at SMPN 4 Cirebon City. The following is a description of literacy and numeracy skills processed using SPSS in class VII students.

Tabel 1. Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
literasi	35	36	80	60.46	13.746
numerasi	35	10	50	33.71	12.853
Valid N (listwise)	35				

Table 1 shows that the mean score for the reading literacy proficiency of seventh-grade students at SMPN 4 Cirebon is 60.46. The mean value of students' reading literacy skills exceeds 50 and falls within the adequate range. A total of 74.3% or 26 out of 35 pupils that participated in the language literacy ability test achieved a score higher than 50. Conversely, 25.7% or 9 out of 35 pupils who participated in the language literacy ability test achieved a score of 50 or less. Moreover, the mean score for the numeracy skills of seventh-grade pupils at SMPN 4 Cirebon is 33.71. The mean value of students' numeracy skills is less than 50 and falls into the low range. A staggering 91.4% or 32 out of 35 children who participated in the numeracy ability exam achieved a score below 50.

Descriptive statistical analysis revealed that pupils' reading literacy skills surpassed their numeracy skills. The findings of this study are consistent with previous research conducted by Emmawita (2020), Ismayani (2019), and Winata et al. (2021), which indicate that students demonstrate higher proficiency in the Indonesian language compared to mathematics. Nevertheless, these two skills have not yet been fully optimised. Hence, it is vital to enhance the calibre of the educational procedure and the integration of AKM for the benefit of both pupils and teachers. The learning process can be focused on AKM, particularly in the subjects of mathematics and Indonesian. This is due to the fact that these two subjects are encompassed under this research instrument. Furthermore, educators might conduct exams that incorporate questions related to AKM, with the intention of familiarising students with AKM-based inquiries.

Furthermore, the effect of literacy skills on students' numeracy abilities can be determined by carrying out analytical tests, namely the correlation coefficient test, simple linear regression test, and the coefficient of determination. The data processing uses the help of IBM SPSS Statistics 22 Software.

The correlation test was used to determine the relationship between literacy skills and the numeracy skills of junior high school students. The results of the correlation test can be seen in Table 2 below.

Tabel 2. Correlations

Correlations

		literasi	numerasi
literasi	Pearson Correlation	1	.410*
	Sig. (2-tailed)		.015
	N	35	35
numerasi	Pearson Correlation	.410*	1
	Sig. (2-tailed)	.015	
	N	35	35

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

Based on the SPSS output results in Table 2. Corerelations, it can be seen that the value obtained is 0.410, meaning that there is a moderate/sufficient relationship between literacy and numeracy abilities. Next on Sig. (2-tailed) the variable of students' literacy and numeracy abilities is 0.015, this value is smaller than the value of α = 0.05. Because the Asymp. Sig (2-tailed) < α, then H0 is rejected and H1 is accepted, meaning there is a correlation. So, it can be concluded that there is a correlation between the literacy and numeracy abilities of junior high school students. Understanding vocabulary makes a major contribution to many fields including mathematics(Riccomini et al., 2015). Furthermore, the results of the normality test for the regression error can be seen in Table 2 below.

Tabel 3. Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	45.689	6.117		7.469	.000
	numerasi	.438	.170	.410	2.579	.015

a. Dependent Variable: literasi

Table 3 shows that the significance value is 0.015, which is smaller than the alpha value of 0.05. Since the two-tailed asymptotic significance is less than the predetermined level of significance (α), the null hypothesis (H0) is rejected in favour of the alternative hypothesis (H1), indicating statistical significance. Therefore, it may be inferred that the literacy skills of junior high school pupils have an impact on their numeracy ability. The extent of the impact is evident in Table 3 provided.

Tabel 4. Determination Coefficient Test

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.410[a]	.168	.143	12.729

a. Predictors: (Constant), numerasi

Based on Table 4, the R value is 0.41 and the coefficient of determination (R-square) is 0.168. This shows the understanding that numeracy ability is influenced by literacy by 16.8% while the rest is influenced by other causes. the integration of learning Indonesian into Mathematics is a very good idea for student development. With this integration, the teacher can provide stimulation for both cognitive and affective development simultaneously(Ahmad, 2019). As a first step, teachers need to understand and improve their literacy and numeracy skills so they can channel them to students during teaching and learning activities in class and outside the classroom (Andreha, 2021).

4. CONCLUSION

Based on the research findings and discussions, it can be inferred that the reading literacy skills and numeracy abilities of class XI students at MA Islamiyah Senori Tuban are in need of improvement. The poor average results on the reading literacy and numeracy abilities tests, specifically 60.46 and 33.71, serve as an indication of this. There is a significant correlation between literacy abilities and numeracy, with a substantial impact of 16.8%.

Conflicts of Interest: Declare conflicts of interest or state "The authors declare no conflict of interest."

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