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# Students' mathematical Literacy Skills in Quantity Content in Solving Relation and Function Problems

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**ABSTRACT**

One of the key requirements for achieving success in the 21 st century is to learn mathematical literacy. Mathematical literacy is one of the fundamental competencies in solving mathematical problems. The purpose of this study was to evaluate students' mathematical literacy skills in the context of quantity content when solving problems related to relations and functions. This study is a qualitative descriptive research that aims to describe the mathematical literacy skills of students at a private junior high school in Cirebon Regency in the context of quantity content when solving problems related to relationships and functions. The results showed that in mathematical literacy skills in *quantity content* in relation and function materials, students with low abilities only met one indicator, namely level 1 and 2 question indicators. Students of moderate ability can achieve two indicators: level 1 and 2 question indicators, as well as level 3 and 4 question indicators. Meanwhile, students with high ability can fulfill all indicators, encompassing level 1 and 2, level 3 and 4, and level 5 and 6 question indicators.

**Keywords:** Literacy, Quantity, Relationship, Function

## 1. INTRODUCTION

One of the important factors in the development of a country is through the field of education. Mathematics is one of the subjects that plays an important role in the field of education. Students' mathematical achievement in the scope of international assessment can be a reference in the evaluation of a country's education. PISA (*Programme for International Student Assessment)* is an international assessment that conducts assessments, one of which is in the field of mathematical literacy.

One of the prerequisites for a person to succeed in the 21st century is to learn mathematical literacy [1] [2] [3]. PISA measures the mathematical literacy ability of 15-year-old students in formulating, using, and interpreting mathematics in various contexts to describe, predict, and explain phenomena and understand the role of mathematics in everyday life [4] [5] [6]. This shows that mathematical literacy has a role in helping someone solve mathematical problems and as a consideration tool in making decisions related to mathematical problems in everyday life.

Several findings show the importance of honing students' mathematical literacy skills [7] [8] [9]. There are several factors that affect students' mathematical literacy skills, including student interaction with teachers and students' views on mathematics [10] [11] [12].

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The elements of a PISA assessment encompass the domains of content, context, and process. The components within these domains, including content, context, and process, are further delineated in Table 1.1.

**Table 1.1.** Components of the PISA Assessment

| Content Domain | Context Domain | Domain Proses |
|---|---|---|
| Number (*Quantity*)<br><br>Space and *Shape*<br><br>Change and *Relationship*<br><br>Probability/*Uncertainty* | Personal<br><br>Occupation (*Occuptional*)<br><br>Society (*Societal*)<br><br>Scientific | Formulate problems mathematically<br><br>Utilizing mathematical concepts, procedures, factual knowledge, and reasoning.<br><br>Interpret, apply, and evaluate the results of a mathematical process. |

The content domain was the focus in this study. Content domains in the PISA math literacy assessment include *Quantity, Space and Shape, Change and Relationship, and Uncertainty.* The main focus of this study is the Quantity (Number) content domain within the assessment of mathematical literacy. The domain of quantity content studied is on relation and function material. Quantity content concerns the association between numbers and numerical patterns, involving the understanding of magnitudes, numerical sequences, and various aspects of numbers in everyday life, such as counting and measuring specific objects. The steps of students in solving mathematical literacy ability problems refer to the domain of the PISA assessment process. The process domain encompasses students' capacity to formulate, utilize, and interpret mathematics when addressing problems [4] [13] [14] [15].

This study was conducted at a private junior high school situated in Cirebon regency. This study focused on the mathematical literacy skills of grade VIII students. The teaching materials used in this study are Relations and Functions. Relation and Function material is a basic material that makes it easier for students to understand more complex material such as integrals, differentials, and so on. Based on the outlined problems, the objective of this study is to examine students' mathematical literacy skills in quantity content while solving problems related to relations and functions.

## 2. METHODS

This research is a descriptive qualitative study aiming to elucidate students' mathematical literacy skills in quantity content when solving problems related to relations and functions. The subjects of the study were taken from grade VIII students in one of the private junior high schools in Cirebon Regency. The research subjects were 6 people taken based on the assessment in the previous semester. The determination of research subjects was carried out by paying attention to the average value of tasks and daily tests. Then the research subjects were divided into three categories, namely high, medium, and low. This study used test instruments on students' mathematical literacy skills on *Quantity content* and interview instruments. The results of student work in solving problems in the Relations and Functions material are then analyzed and described based on students' mathematical literacy skills.

## 3. RESULTS AND DISCUSSION

Research on students' mathematical literacy skills on *quantity content in solving problems* Relations and functions are analyzed through the results of student work in solving given problems.

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The test questions contain 6 questions that have been tested for validity and reliability. The test questions given are oriented towards PISA levels 1 to 6. The indicator of level 1 and 2 questions is to formulate problems systematically. The indicator of level 3 and 4 is reasoning. The indicator of level 5 and 6 questions is to solve problems. Student answers are reinforced by interview techniques conducted on research subjects. The research subjects of 6 people were divided into three categories, namely high, medium, and low in solving students' mathematical literacy ability problems in *the Quantity content* on the Relations and Functions material.

Data on students' mathematical literacy skills on *quantity* content in solving problems Relations and functions are as follows.

**Table 3.1.** Grouping students based on the category of solving math literacy skills problemsta

| Subject | Category |
|---|---|
| S-1 | High |
| S-2 | High |
| S-3 | Medium |
| S-4 | Medium |
| S-5 | Low |
| S-6 | Low |

S-1 and S-2 subjects are able to formulate problems systematically, reason, and solve mathematical literacy problems. This is reinforced by the results of interviews which show that S-1 and S-2 subjects can formulate problems systematically, reason, and solve students' mathematical literacy problems on *quantity content* in relation and function materials.

S-3 and S-4 subjects are able to formulate problems systematically and are quite capable of reasoning. But it has not been able to solve the problem of mathematical literacy. This is reinforced by the results of interviews which show that S-3 and S-4 subjects have difficulties, especially in solving students' mathematical literacy problems in *quantity content* on relation and function materials.

S-5 and S-6 subjects are quite capable of formulating problems systematically, but have not been able to reason and solve mathematical literacy problems. This is reinforced by the results of interviews which show that S-5 and S-6 subjects have difficulties in formulating problems systematically, reasoning, and solving students' mathematical literacy problems on *quantity content* in relation and function materials.

## CONCLUSION

Based on the research results, it can be concluded that regarding mathematical literacy proficiency in quantity content within relation and function materials, students with low abilities only fulfill one indicator, namely the indicators of level 1 and 2 questions. Students with low abilities are only capable of systematically formulating problems. Students with moderate ability can meet two indicators, namely level 1 and 2 question indicators and level 3 and 4 question indicators. Students with moderate ability are able to formulate problems systematically and are quite capable of reasoning. Students with high ability are able to meet all indicators, namely level 1 and 2, 3 and 4, and 5 and 6 question indicators. Students with high abilities are able to formulate problems systematically, reason, and solve mathematical literacy problems.

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*Etnomatnesia*. This article discusses the improvement of mathematical literacy skills in students through the PMRI approach based on PISA questions.