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Mathematics Literacy of Class Ix Students of Smp Pelita 1 Jakarta from Learning Style and English Ability

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Article Info

Abstract

In this research to analyze differences in learning styles and English language ability on the mathematical literacy of grade IX students of SMP Pelita 1 West Jakarta. The methodology used in this research is sequential mixed methods type explanatory sequential. Data collection techniques used is Documents, Questionnaires, Tests, and Interviews. One Way Anova test is used to determine the difference in mathematical literacy between learning styles. Correlation analysis was used to determine the correlation between English language ability and mathematical literacy. The analysis to find out the differences in learning styles and English language skills on mathematical literacy was carried out by conducting a two-way analysis and deepened by data triangulation. Based on the results of the study, the subject of Assimilation group I had mathematical literacy which included the seven components of mathematical literacy. Students' understanding of learning styles and their English language ability will make it easier for students to understand the seven components of mathematical literacy.

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INTRODUCTION

The National Council of Teachers of Mathematics (NCTM) (Kersaint, et.al, 2009: 42) has set "five goals for all students in Curriculum and Evaluation Standards for School Mathematics", namely: (1) that they learn to value mathematics; (2) that they become confident in their ability to do mathematics; (3) that they become mathematical problem solvers; (4) that they learn to communicate mathematically; and (5) that they learn to reason mathematically.

Mathematical communication is closely related to skills in the application of mathematics, both in everyday life and in helping to learn other sciences in reading statistical data, measurements, algebra, other materials. Someone who has good mathematical literacy can estimate, interpret data, solve everyday problems, reason in numerical, graphical, geometric situations, and communicate using mathematics. The Organization for Economic Co-operation and Development (OECD) conducts the PISA study. PISA stands for "Programme for International Student Assessment". The first survey was in 2000 and is conducted every three years. Matters of concern include literacy achievement in reading, mathematics, and science for 15 years old school students (Stacey 2010). Indonesia's participation in the PISA study since 2000 shows that the achievements of Indonesian students in several PISA outputs are always unsatisfactory. In 2012, Indonesia received a score of 375 while the OECD average was 494 and was ranked 64th out of 65 participating countries. In 2015, Indonesia scored 386 while the OECD average was 490 and was ranked 62nd out of 70 participating countries. Indonesia has always been below the OECD average.

Mathematics is not only seen as a scientific discipline but how students apply this knowledge in real-world problems or everyday life. Mathematical literacy skills can help students to understand the rules that make mathematics a reference to reality and to make the necessary considerations and decisions by constructing, using, and reflecting on themselves as students. Good students will use their mathematical literacy skills to prepare themselves for socializing in modern society (OECD, 2014).

Mathematics subjects are given to students starting from elementary school to equip students with the ability to think logically, analytically, systematically, critically, and creatively as well as the ability to work together. This given ability becomes the focus and attention of mathematics learning in the classroom because it is related to the nature and personality characteristics of students. Learning is a process that continues to develop for each student. The success of learning is not only determined by the curriculum used, the facilities and infrastructure available, as well as the teachers who teach, but also by the personal characteristics of students (Rahman, 2008).

Differences in learning styles can cause differences in understanding of information and can cause differences in solving problems for everyone (Ilmiyah & Masriyah, 2013). Learning styles cause differences in students' problem-solving abilities (Ricardo et.al, 2014). One of the most important aspects of education today is the learning style of students because their success depends on how they learn best which can be achieved by understanding each other's differences and keeping this in mind in education (Ramadan, 2011). Learning styles have a positive correlation with student learning goals and achievements, typical ways of acquiring knowledge, and the chosen achievement goals or reasons for completing assignments (Akram et.al, 2013). The problem solves results obtained for each different learning style have different problem-solving abilities (Riau, 2016).

Students' understanding of their learning style will make it easier for them to learn something and display their best abilities. The percentage of understanding of learning styles determines the percentage of students' understanding of their mathematical literacy. Mathematical literacy can be reviewed through David Kolb's learning style. Kolb's research instrument is based on experiential learning theory. Learning is not only judged by the result alone but rather seen as a circular (cyclic) process.

The term "experiential" (experience) is used to distinguish this theory from cognitive learning theory, which emphasizes cognition over affect, and from behavioral learning theory which tends to ignore the role of subjective experience in the learning process. Real knowledge is obtained from a combination of

absorption and processing of experience. The results of research and clinical observations based on LSI (Learning Style Inventory) have resulted in the conclusion that there are four common David Kolb learning styles, namely Diverging, Assimilating, Accommodating, and Converging (Kolb & Kolb, 2005).

Communication is the exchange of news or information. All our senses can be used to communicate. Humans can use the vocal cords, tongue, lips, teeth well to produce various sounds. The resulting sound becomes a language that is used to communicate. Language is a means of communication in everyday life and between countries. It has been agreed that English is the international language used in communication. This language for communication is always used to measure mathematical literacy skills at the international level such as PISA.

As stated by Hendrasworo (2009) in his article, English is the official language or at least has a special position in 75 countries and is used in more than 100 countries. English is the international language for business, sports, academics, science, technology, advertising. Diplomacy.

The Indonesian government is aware of the importance of English so that English becomes a compulsory subject at every level of education and even becomes one of the subjects of the national exam. This proves that English holds an important position in our world of education. Our world of education is required to shape and produce human beings who can compete for both on a national and international scale. One way to compete internationally is to master a foreign language, especially English.

Mathematics is a tool for thinking, the language of science, procedures for knowledge, deductive inferences (Wittgenstein in Suyitno, 2008). Mathematics besides being a tool also functions as a language. Propositions show a logical structure, thoughts are meaningful propositions, the totality of propositions is language (Suyitno, 2008). There is a very close relationship between language, logic, the world (Suyitno, 2007). Suyitno's research states that every conversation about the world always requires logic and language. Wittgenstein's opinion is by the view that mathematics is the queen of science. Mathematics is a necessary condition of a grammar game (Suyitno, 2007). Based on this thought, it can be concluded that language arises from a logical structure that can be trained by studying mathematics. In this case, the measurement of mathematical ability is to be measured in mathematical literacy. Because mathematical literacy is a necessary condition for communicating or getting the ability to speak English. So that when students have high English language skills, students' mathematical literacy is high and vice versa.

Based on observations made at SMP Pelita 1 West Jakarta in the 2018/2019 academic year in class IX, there is a diversity of Mathematics scores at SMP Pelita 1 Class IX West Jakarta. Some students with high mid-semester math report cards scored low mid-semester English scores, but some students scored high mid-semester English scores or vice versa. The diversity of mid-semester English scores for all students was grouped by the researcher into two groups by looking at the mid-semester English scores at SMP Pelita 1. The groupings were group I, and group II. group I is a group of students with a mid-semester score of more than 60. Group II is a group of students with a mid-semester score of less than or equal to 60. Each result of the diversity of English values through the mid-semester scores they have obtained for the mid-semester math report card score is sufficiently interesting to be studied by researchers.

METHODS

This research method uses a combination research method (Mixed Methods). According to Sugiyono (2012: 404) that, the combined research method (mixed methods) is a research method that combines or combines quantitative methods and qualitative methods to be used together in research activity to obtain more comprehensive, valid data, reliable and objective. This method was chosen because it wanted to get data from research results that were strong and mutually supportive between quantitative and qualitative.

The method used in this research is sequential mixed methods (sequential combination) explanatory sequential type (sequence of proof method). Sequential explanatory is chosen because quantitative is carried out first and dominates in this research design. The results of the analysis of differences in student learning styles as quantitative will be used as a basis for data

information which will then be strengthened by the qualitative English language skills of students who are grouped into four groups of learning styles and two groups of English language skills.

This research begins with a preliminary study conducted by analyzing problems that occur in the field, conducting interviews with teachers in the field of study. After the preliminary study, it is continued with the collection of quantitative and qualitative data which is then interpreted to interpret the results.

The grouping of learning styles from 65 students obtained 27 Assimilation students, 20 Convergent students, 10 Divergent students. and 8 Accommodation students. The grouping based on the value of English language skills was taken from the documentation of the mid-semester grades for class VIII for the 2017/2018 school year which was obtained by 35 students in group I, and 30 students in group II. TKLM was taken for class IX students of SMP Pelita 1 West Jakarta to obtain data on mathematical literacy skills which would then be analyzed quantitatively. The last stage is the confirmation stage to determine the effect of learning styles and English language skills on the mathematical literacy of class IX students of SMP Pelita 1 West Jakarta in the 2018/2019 academic year by taking research subjects of class IX students who have heterogeneous learning styles and English language skills.

The population in this study was class IX students of SMP Pelita 1 West Jakarta in the 2018/2019 academic year as many as 70 students with research samples to answer the first and second problem formulations, namely class IX-A and class IX-B as many as 65 students. The sampling technique used to answer the third problem formulation is the purposive sampling technique because the sampling is based on certain considerations based on learning styles and English language skills in groups I, or II.

The first analysis was conducted by looking at the differences in mathematical literacy between Diverging, Assimilating, Accommodating, and Converging learning styles using a comparative test of more than two samples (One Way Anova). The second analysis is to determine the correlation between English language proficiency and mathematical literacy using correlation analysis. The last data analysis is an analysis to find out the differences in learning styles and English language skills on the mathematical literacy of grade IX students of SMP Pelita 1 West Jakarta in the 2018/2019 school year by conducting a two-way analysis and deepened by data triangulation. Triangulation was carried out in this study by means of technical triangulation, namely comparing and re-checking the degree of confidence in information obtained through different techniques to obtain data from the same source. The achievement of technical triangulation in this study was carried out to compare how to do TKLM with students' learning styles and English language skills through interviews.

Table 1 quantitative research data sources

Learning Styles	English Language Ability		Total
	Ability 1	Ability 2	
Assimilating	19 student	8 student	27 student
Converging	10 student	10 student	20 student
Diverging	4 student	6 student	10 student
Accommodating	2 student	6 student	8 student
Total	35 student	30 student	65 student

Tabel 2 qualitative research data sources

Learning Styles	English Language Ability		Total
	Ability 1	Ability 2	
Assimilating	2 student	2 student	4 student
Converging	2 student	2 student	4 student
Diverging	2 student	2 student	4 student
Accommodating	2 student	2 student	4 student
Total	4 student	4 student	16 student

Analysis of quantitative and qualitative data was carried out by comparing quantitative data, the results of quantitative research in the first stage, and the results of qualitative research in the second stage. Through this data analysis, information can be obtained whether the two data complement each other, expand, deepen, or even contradict (Sugiyono 2016).

RESULTS AND DISCUSSIONS

Grouping of students based on learning styles is done at the beginning of the meeting through filling out a learning style questionnaire by students. The results of filling out the questionnaire were obtained by 27 students with assimilation learning styles, 20 students with convergent learning styles, 10 students with different learning styles, and 8 students with accommodation learning styles. The grouping of students based on their ability to speak English seen from the documentation of the students' mid-semester test scores obtained 35 students in group I, and 30 students in group II.

Students who were selected as research subjects based on their learning styles and English language skills were 16 students, namely 2 students of the assimilation learning style of English language skills I E-1 and E-2, 2 students of the assimilation learning style of English language skills II E-29 and E-34, 2 students convergent learning style English ability I E-6 and E-12, 2 students convergent learning style English ability II E-11 and E-18, 2 students learning style divergent English ability I E -15 and E-19, 2 students with different learning styles in English language skills II E-31 and E-51, 2 students with accommodation learning styles in English skills I E-21 and E-30, and 2 students with accommodation learning styles in English skills II E-36 and E-43.

The validity of the interview data was checked first through oral and written interviews. Information that has been valid is collected and reduced, then presented in this report. The literacy skills described include the seven components of mathematical literacy, namely (1) communication; (2) mathematizing; (3) representations; (4) reasoning and arguments; (5) devising strategies for solving problems; (6) using symbolic, formal, and technical language and operations; and (7) using mathematical tools.

Quantitative research was conducted to analyze differences in mathematical literacy between divergent, assimilating, accomodating, and converging learning styles. Differences in learning styles can cause differences in understanding of information and can cause differences in solving problems for everyone (Ilmiyah & Masriyah, 2013). One of the most important aspects of education today is the learning style of students because their success depends on how they learn best which can be achieved by understanding each other's differences and keeping this in mind in education (Ramadan, 2011). Differences in students' understanding of their learning styles affect their different mathematical literacy abilities.

Comparative tests of more than two samples were used to determine differences in mathematical literacy based on learning styles. The test was carried out with One Way, Anova using the SPSS application. Obtained by a significance value of 0.007 <0.05. Thus, it can be said that there is a difference in average mathematical literacy between Diverging, Assimilating, Accommodating, and Converging learning styles for grade IX students of SMP Pelita 1 West Jakarta in the 2018/2019 school year.

Quantitative research was conducted to determine the positive correlation between English language skills and mathematical literacy.

Communication is the exchange of news or information. All our senses can be used to communicate. Humans can use the vocal cords, tongue, lips, teeth properly to produce various sounds. The resulting sound becomes a language used for communication. Language is a means of communication in everyday life and between countries. Mathematics is a necessary condition of a grammar game (Suyitno, 2007). So, it can be concluded that there is a positive correlation between English language skills and mathematical literacy.

A Correlation test is used to determine the relationship between English language skills and mathematical literacy. The test was carried out with the help of the SPSS application. Obtained by a significance value of 0.000 < 0.05. Thus, it can be said that there is a positive relationship between English language skills and mathematical literacy of grade IX students of SMP Pelita 1 West Jakarta in the 2018/2019 academic year, which is 0.707 or 70.7%.

Mixed methods research was conducted to determine the effect of learning styles and English language skills on mathematical literacy. The method used in this research is sequential mixed methods (sequential combination) explanatory sequential type (sequence of proof method). Mathematics is a tool of thought, language knowledge, procedures for knowledge, deductive inferences (Wittgenstein in Suyitno, 2008). Mathematics besides being a tool also functions as a language. Propositions show a logical structure, thoughts are meaningful propositions, the totality of propositions is language (Suyitno, 2008). There is a very close relationship between language, logic the world (Suyitno, 2007). Students' understanding of their learning style will make it easier for them to learn something and display their best abilities. Learning styles cause differences in students' problem-solving abilities (Ricardo et.al, 2014). This analysis of differences in learning styles and language skills needs to be done to determine mathematical literacy abilities.

Table 3 Summary of Mathematical Literacy Analysis Results with Heterogeneous Learning Styles and English Ability.
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Mathematical Literacy Component		Mathematical Literacy Analysis Results with Heterogeneous Learning Styles and English Ability							
		Assimilating		Konfergen		Difergen		Akomodasi	
		I	II	I	II	I	II	I	II
Communication		√	×	√	×	√	×	×	×
	×	√	×	√	×	×	×	×	×
Mathematising		√	×	√	×	×	×	×	×
	×	√	×	√	×	×	×	×	×
Representation		√	×	√	√	×	×	×	×
	×	√	×	√	√	√	×	×	×
Reasoning and		×	×	×	×	√	×	√	√

The summary of the results of the analysis of components of mathematical literacy is shown in Table 3. The sign indicates that the research subject can apply the mathematical literacy component, while the × sign indicates that the research subject is unable to apply the mathematical literacy component. The results of the summary analysis show that the assimilated and convergent learning styles with English language skills I master mathematical literacy.

CONCLUSION

Based on the results of the research and discussion that have been described, the conclusions obtained are: Analysis of the differences in learning styles and English language skills on the mathematical literacy of grade IX students of SMP Pelita 1 West Jakarta obtained the results 1) Seven components of mathematical literacy are only mastered by students who have convergent learning style with English language skills I. 2) Two groups of students with assimilation and divergent learning styles with English language skills II did not master the seven components of mathematical literacy. Students' understanding of learning styles and their English language skills will make it easier for students to understand the seven components of mathematical literacy. This research is only limited to mathematical literacy in terms of David Kolb's learning style and English proficiency in the high and low groups. So that literacy skills based on different learning styles and English language skills (high, medium, low) are not yet known, thus requiring

further research with larger research subjects to be more convincing or to strengthen the results of the research produced. Literacy in terms of the language of instruction other than English also needs to be studied further

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