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Mathematical Literacy Ability And Self-Efficacy Students In Search Solve Create And Share (SSCS) Learning With Contextual Approaches

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Abstract

The objectives of this study are to test the quality of SSCS learning with a contextual approach and describe the mathematical literacy skill in terms of students' self-efficacy levels. This research was a type of mixed quantitative and qualitative research. This research was conducted at a State Senior High School named SMA N 1 Kendal in the academic year of 2015/2016. The research subjects were X grade students consisting of one experimental class with the SSCS learning treatment with a contextual approach and one control class. In the experimental class, it was chosen 2 students in the high, medium, and low categories based on students' self-efficacy. Testing the quality of learning was seen from 3 stages, namely the stages of planning, implementation, and assessment. The results were obtained that SSCS learning with contextual approach is in good quality. Students with high categories for high self-efficacy and low self-efficacy can fulfill the seven components of mathematics literacy well. Students with categorization for high self-efficacy and low self-efficacy are able to fulfill the six components of mathematics literacy well but they are still lacking in the reasoning and argument components. Students with low categories for high or low self-efficacy both have good ability in the communication component but are lacking in the other six components of mathematical literacy.

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INTRODUCTION

Mathematics is a universal science which underlies the development of modern technology, it has an important role in various disciplines and develops the power of human thought. Mathematics is studied and developed to form students' ability to think logically, rationally, analytically, systematically, critically, and creatively (Wardono, et al, 2015; Arvyaty & Saputra, 2013; Richardo, 2016).

Mathematical literacy is defined as the capacity of individuals to formulate, apply and interpret mathematics in various contexts (OECD, 2006). PISA 2012 results indicate that the mathematics score at PISA 2012, Indonesia is ranked 63rd out of 64 countries (OECD, 2014). This is far below the ranking of neighboring countries such as Malaysia, Thailand, and Vietnam. Indonesia only scored 375 very far below Vietnam which scored 511. Based on these results it can be seen that the mathematical ability of Indonesian students are still very low when it is compared to other countries.

Mathematical literacy is an important thing that must be owned by society today, which includes the process of solving problems, assessing, communicating, and thinking critically and creatively (Taskin & Belma, 2014). Mathematical literacy is the skill to identify, understand, and engage in mathematics, as well as the skill to analyze the role of mathematics in everyday life (Guzel & Giray, 2005). It is increasingly convincing that mathematics literacy skill is an important thing that students must have so that they use in their daily lives and to help them face future challenges.

Based on the research results of Mahdiansyah and Rahmawati (2014), it shows that the level of mathematics literacy of Senior High School/Senior High School students is still low. This shows students are less able to give a description or argument on mathematical problems. The results of researchers' interviews with mathematics teachers at State Senior High School 1 *Kendal*, it is obtained the fact that students have difficulty in solving their main problems for problems related to daily life and story problems, there are still many students who have not been able to write math solutions correctly, and have not used the correct step. Students still have difficulty in writing and describing problems in mathematical modeling.

The OECD (2013) stated that the mathematical literacy assessment framework in PISA includes the skill of processes involving seven components of mathematical literacy, they are: 1) Communication, 2) Mathematics, 3) Representation, 4) Reasoning and Argument, 5) Devising Strategy for Solving Problems, 6) Using Symbolic, Formal, and Technical Language and Operations, and 7) Using Mathematical Tools.

In the 2013 curriculum, it was said that in mathematics learning, mathematical hard skills and mathematical soft skills are including values in cultural and character education, it must be developed simultaneously and balanced through learning with a scientific approach. One of these mathematical soft skills is self-efficacy. Self-efficacy is an individual's belief about their skill to produce a performance that affects their lives (Bandura, 1977).

As stated by Gulcin and Melek (2014) "...to improve mathematics literacy, students are given problems related to real life and open problems". One of the lessons that present contextual problems is SSCS learning with a contextual approach. Search Solve Create and Share (SSCS) learning is learning that involves students in each stage, they are: the Search stage, the Solve stage (the problem-solving stage), the Create stage (concluding stage), and Share stage (display stage) (Deli, 2015).

SSCS learning with a contextual approach is expected to improve the mathematical literacy ability of senior high school students in solving various problems. So teachers can provide appropriate learning or coaching.

The purposes of this study are (1) to determine the quality of SSCS learning with a contextual approach and (2) to describe the ability of mathematical literacy in terms of students' self-efficacy.

METHOD

This research used mixed methods research with concurrent embedded research design. Concurrent embedded design is a research method that combines qualitative and quantitative research

methods by mixing the two methods unbalanced (Sugiyono 2015: 537).

The study began with a preliminary study to identify problems in the field by conducting studies on data, interviews with teachers, and studies in the literature. Furthermore, the researcher conducted quantitative and qualitative research together.

Quantitative research was to determine the effectiveness of SSCS learning with a contextual approach, while qualitative research was to determine the description of mathematical literacy skill based on students' self-efficacy. The quantitative stage in this study used an alternative treatment post-test only with non-equivalent group design.

The population in this study were students of X grade of Natural Science of State Senior High School 1 Kendal, who then selected one class as an experimental class and one class as a control class. The experimental class was a class that is then given SSCS learning with a contextual approach. In qualitative research, the research subjects used were students from the experimental class. Research subjects were selected based on students' level of self-efficacy. The classification of students' self-efficacy was conducted based on the results of the initial self-efficacy scale given to students.

Analysis of learning quality data in this study was carried out at three stages, they are planning, implementation, and assessment. Measurement of the quality of learning in the planning stage was conducted by testing the validity of the devices and instruments in the minimal good category. Measurement of the quality of learning in the implementation phase was seen through two aspects, they are the implementation of learning and student responses. The assessment stage was to measure the results of the implementation of learning towards the achievement of learning objectives.

The quantitative data analysis techniques were performed on initial data and final data. The initial data analysis technique consisted of a normality test, a homogeneity test, and a two-average similarity test. While the final data test included individual completeness test, classical completeness test, and comparative test.

Analysis of mathematical literacy ability in terms of self-efficacy was guided by Miles and Huberman's qualitative analysis that activities in qualitative data analysis were carried out interactively and take place continuously at each stage of the research until completion, and the data was saturated. This analysis technique contained three main steps, they are data reduction, data presentation, and drawing conclusions.

RESULTS AND DISCUSSION

Based on the results of the initial self-efficacy scale in the experimental class, the results obtained are as in Table 1.

Table 1. Grouping of Students Based on Self-Efficacy

Category	The number of students	Percentage
High	3	9.68
Medium	22	70.97
Low	6	19.35
Total	31	100

In each category, 2 students are selected for in-depth analysis of their mathematical literacy skill. The selection of students with high categories is obtained 2 students with the highest self-efficacy namely SET1 students and students with the lowest self-efficacy namely SET2 students. The selection of students in the medium category is obtained 2 students with the highest self-efficacy, namely SES1 students and students with the lowest self-efficacy, namely SES2 students. Whereas, the selection of students in the low category is obtained 2 students with the highest self-efficacy namely SER1 students and students with the lowest self-efficacy that were SER2.

Based on the results of the initial data analysis, it is found that the initial data are normally distributed, homogeneous, and the average initial data of the experimental and control groups are the same. Based on these results, it can be said that the experimental group and the control group came from the same initial ability.

The quality of the learning results of the implementation phase is obtained based on the results of the validator's assessment of the research instruments.

A summary of the results of the validator's assessment of learning instruments is in Table 2.

Table 2. Results of the Validator Assessment of Learning Instruments

Instruments	The average score	Category
Syllabus	4.07	Good
Lesson Plan	4.15	Good
Teaching materials	3.92	Good

A summary of the results of the validator's assessment of the research instruments is in Table 3.

Table 3. Results of the Validator Assessment of Research Instruments

Instrument	The average score	Category
Self-efficacy Scale	4.00	Good
Initial mathematical literacy ability qustion test	4.07	Good
Final mathematical literacy ability qustion test	4.07	Good
Learning Implementation Observation Sheet	4.11	Good
Student Response Questionnaire	4.13	Good

Based on the results of the assessment of the validator, it is obtained an average score for learning instrument and research instruments included in both categories so that the planning stage can be said to be of good quality.

At the implementation stage, measuring the quality of SSCS learning with a contextual approach is carried out by carrying out observations of the implementation of learning and giving questionnaires to student responses. The average score of the feasibility of learning is 3.9 while the average score of student responses is 4.17. Based on observations of the implementation of learning and student questionnaire responses, it is obtained an average of 4.03, so it can be said the implementation of learning in the category is very good.

At the assessment stage, measuring the quality of SSCS learning with a quantitative contextual approach is carried out by giving the final mathematical literacy ability question test. The purpose of final mathematical literacy ability qustion test is to test the effectiveness of SSCS learning with a contextual approach and analyze the final data of students' mathematical literacy skill.

To test the effectiveness of SSCS learning with a contextual several tests are conducted on the final data namely the students' final mathematical literacy ability question test. Tests that are carried out are individual completeness tests, classical completeness tests, and comparative tests of mathematical literacy skill.

Individual completeness test uses the t test, which is the average test of one tail test. The test results obtained t_{count} = 1.71> t_{table} = 1.69 so that H_0 is rejected and H_1 is accepted. So, the average test is higher than 70. The classical completeness test uses the proportion test that is the z test. It is obtained z_{count} = 2,021≥$ztabel$ = 1.64, so H_0 is rejected and H_1 is accepted. Thus, the percentage of students who aee taught by using SSCS learning with a contextual approach that scores higher than or equal to 70 reaches 75%. A comparative test of mathematical literacy using the t-test with the results of t_{count} = 2.13> 1.67 = t_{table} so that H_1 is accepted and H_0 is rejected. So, the average mathematical literacy skill of the experimental group students is higher than the control group students. From the results of the description above it can be said that SSCS learning with contextual approaches is effective towards mathematical literacy skill.

So, if it is seen from the 3 stages of learning quality testing, namely the planning, implementation, and assessment stages can be said if SSCS learning has a good quality.

Students' Mathematical literacy skill with a high category is obtained that SET1 students already had good mathematical literacy skill. SET1 students can mention the information that is known in the problem, make a mathematical model and use the right strategies and completion steps. Neither SET2 students, the results obtained that SET2 students also do not have significant obstacles in solving math literacy problems. So it can be concluded if students with high categories, for high self-efficacy or low self-efficacy, both are very able to identify problems and interpret them into mathematical models and pictures completely and use appropriate mathematical tools and symbols. Students in the high category have fulfilled all the components of mathematical literacy well.

Students' mathematical literacy skill with the medium category is obtained that SES1 students can identify components in mathematical literacy problems well, can make mathematical models and apply them, and can use mathematical symbols well. However, students still have difficulty in making conclusions according to the context of the existing problem. SES2 students also experience the same thing in reasoning and argument abilities. The results obtained that SES2 students have not been able to provide a complete argument and relate it to the context of the problem given. So, students in the medium category for high self-efficacy and low self-efficacy can fulfill the six components of mathematics literacy well but still have shortcomings in the components of reasoning and argument.

Students with low categories still have difficulty in solving math literacy problems. Both SER1 and SER2 students can mention what information is known from the problem but it is incomplete and inappropriate in the context of the problem. SER1 students can use mathematical models but it is incomplete, while SER2 students cannot make the model problems correctly. Besides, SER1 students and SER2 students still have difficulty in making symbols and using appropriate strategies and representing problems in the form of images. So students with low categories for high self-efficacy and low self-efficacy, both of them have fulfilled the communication component well but they are still lacking in the other six components of mathematical literacy.

The Search, Solve, Create, and Share (SSCS) learning model has the advantage of being able to provide opportunities for students to develop problem-solving skill (Anggraeni, et al., 2016). Each stage of SSCS learning can involve students investigating new situations, think about several questions and solve problems realistically so that the SSCS learning model can encourage students to understand concepts in every mathematics learning (Agustin, et al., 2018). A contextual approach is a learning concept that helps teachers link material taught with real-world situations of students and encourages students to make connections between the knowledge they have and their application in daily life (Aqib, 2013). So that it can be said that SSCS learning helps students express students' thinking and make students participate more actively in learning by expressing their ideas, so learning can be carried out well. Good learning can help students learn more deeply by storing what students have learned and using it in the context of existing problems.

Johan's research results (2012) showed that there was a significant improvement in problem-solving skills and formulating problems in SSCS learning. Research of Mulyana, et al (2018) stated that the SSCS learning model can improve the ability to make mathematical models and students' cooperation.

Febrina (2013) stated that there was a relationship between self-efficacy and student learning achievement. The higher the level of self-efficacy, the higher the learning achievement obtained, conversely the lower the students' self-efficacy, the lower the learning achievement obtained.

This opinion supports the results of this study, namely the level of student self-efficacy affects the ability of mathematical literacy it has. SSCS learning with a contextual approach given to students can develop students' mathematical literacy ability and develop students' self-efficacy. Based on the results of the study, students with high categories can identify problems and interpret them into mathematical models and pictures completely and use appropriate mathematical tools and symbols. This helps students in developing strategies with steps that are coherent in working on the problem so that students are easy in giving reasonable conclusions. Students in the medium category can identify information in the problem, use symbols and mathematical tools in simplifying the problem into the picture and mathematical models but they are still lacking in the ability to provide reasonable conclusions in accordance with the context of the problem. Students with low categories tend to have low literacy criteria. Students with low categories are able to identify problems that exist in the problem but have the disadvantage of finding appropriate strategies and steps to solve problems. The lack of students' ability to make mathematical models become a limiting factor for developing mathematical literacy problem-solving strategies.

CONCLUSION

It is concluded that SSCS learning with contextual approach ha a good quality. Students with high categories for high self-efficacy and low self-

efficacy are both able to fulfill the seven components of mathematics literacy well. Students with a medium category for high self-efficacy and low self-efficacy can fulfill the six components of mathematics literacy well but they are still lacking in the reasoning and argument component. Students with low categories for high or low self-efficacy both have good abilities in the communication component but still, lack in the other six components of mathematical literacy.

From this conclusion, SSCS learning with a contextual approach can be used as an alternative for teachers to be applied in the classroom to improve students' mathematical literacy skill. For students with medium and low self-efficacy skill, the teacher can provide motivation so that students can be more confident in their skill to use mathematical ideas so that they are more optimal in solving mathematical problems.

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