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The Analysis of Student Science Literacy in Terms of Interpersonal Intelligence

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Abstract

The purpose of this study was to describe the profile of interpersonal intelligence and science literacy through the application of Two Stay Two Stray cooperative learning model conducted in MI Miftahul Ulum 01, MI Roudlotut Tholibin, and MI Salafiyah in Kudus. This research uses mixed method with concurrent embedded research design. Technique of collecting data using pretest Literasi of Science with 10 item of description and posttest of Literasi of Science with 13 item of description and questionnaire of interpersonal intelligence. Data analysis techniques were normality test, homogeneity test, N-gain and t-test. The result of data analysis shows that there are differences in the increase of Science Literacy results from high, medium and low interpersonal intelligence ie 0.382; 0,341; and 0.192. Based on the research data, the application of Two Stay Two Stray cooperative learning model assisted by visual media can help improve the students' science literacy. The benefits of this research is to contribute thoughts to the effort to improve Literacy Science through the application of cooperative learning model Two Stay Two Stray assisted visual media in terms of interpersonal intelligence.

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INTRODUCTION

One of the government's efforts in improving the quality of human resources to be able to compete in the global era and adjust to the changes and the development of science and technology is through education.

Indonesia's participation in the International Trends study in the International Mathematics and Science Study (TIMSS) and the Program for International Student Assessment (PISA) by the Organization for Economic Cooperation and Development (OECD) since 1999 shows that the achievements of Indonesian children are not encouraging in the number of reports issued by TIMSS and PISA. This is due to among other things, to the large number of test materials asked in TIMSS and PISA which were not included in the Indonesian curriculum. Based on the results of the PISA study in 2015, Indonesia ranked 63 out of 72 participating countries from the assessment in reading, math and science, which was attended by more than 28 million students aged about 15 years. This result is not so far from PISA results in 2012 where Indonesia was ranked 64th out of 65 participating countries.

Similar to PISA, TIMSS findings in 2015 showed that Indonesia is ranked 45 out of 48 participating countries in the field of Science. The PISA and TIMSS results are widely used by participating countries to improve the quality and education policy. Likewise with Indonesia, the low yield of PISA and TIMSS especially for Science shows that students still have difficulty in applying concepts in daily life, analyzing a situation, integrating information, and drawing a conclusion.

Science literacy is defined by PISA as the ability to engage with science-related issues. This PISA definition includes being able to explain scientific phenomena, evaluate and design scientific inquiry, interpret data and scientific evidence. Science literacy also emphasizes the ability to apply scientific knowledge to the context of real life situations (OECD, 2017).

In addition to the problem of the low science literacy students in Indonesia, the problem of special attention in the world of education is the rampant cases of abuse conducted by students to prove that the ability of students in understanding and empathy on the feelings of others is still lack. UNESCO conveys that learning in the 21st century should be tailored to the four pillars of education, namely learning to know, learning to do, learning to be, and learning how to live together. The last pillar relates to human interaction with one another, in this case the interaction of students one with other students and students with the teacher. Gardner called it with interpersonal intelligence. Interpersonal intelligence is the ability to understand others (Gardner in Baum, 2005.

In an effort to increase the science literacy of students it is required a learning model that can stimulate students to be active in communicating and working together and help each other. One of the learning models that triggered the students' activity is the Two Stay Two Stray learning model developed by Spencer Kagan (1992). Students will not only interact in their discussion groups but also build interactions to exchange information and share the results of group work with other groups. Implementation of Two Stay Two Stray cooperative learning model is also supported by the use of Visual media that can provide a relationship between the content of subject matter with the real world. Visual media helps students to not only imagine about the material presented by the teacher but also provide an overview to the students.

In addition, through the implementation of Two Stay Two Stray model aided by Visual media, it is expected that learning messages can be more achieved because the cooperation between students can be well established, the students support each other and support in completing each learning task given. Learning materials associated with the surrounding environment and displayed through Visual media facilitate students and can encourage students to be active, creative and attract students' interest in learning so that they can easily understand between the material taught by

its application in everyday life that impact on the emergence of interpersonal intelligence and increased science literacy.

The objectives of this research are: (1) Describe the interpersonal intelligence profile of MI students through the application of cooperative learning model Two Stay Two Stray assisted visual media, (2) Describe the science literacy skill ability of MI students through the application of cooperative learning model Two Stay Two Stray assisted visual media, (3) Describe the factors that influence the interpersonal intelligence of MI students. Benefits from the results of this study is expected to contribute thoughts to efforts to improve science literacy in terms of interpersonal intelligence through the application of co-operative learning model Two Stay Two Stray as-sisted visual media..

METHODS

This research method using mixed method with concurrent embedded research design. Creswell (2015) defines a mixed method as a procedure for collecting, analyzing, and 'mixing' quantitative and qualitative methods in a study or series of studies to understand the research problem.

This research was conducted in MI NU Salafiyah, MI Miftahul Ulum 01, and MI NU Roudlotut Tholibin in the even semester of the academic year 2017/2018. The population in this research is all students of class V Kecamatan Jekulo Kudus in the academic year 2017/2018. From several schools selected 3 schools as research subjects in accordance with the research design.

This study took a sample of students of class V MI NU Salafiyah, MI Miftahul Ulum 01, and MI Raoudlotut Tholibin. Research subjects will get the intervention learning model two stay two stray assisted visual media to be grouped based on the level of interpersonal intelligence. Then from the level of interpersonal intelligence is taken 2 students to be the subject of qualitative research to know the profile of interpersonal intelligence.

Analysis of the data used in this study include: (1) Normality Test, to determine the sample normal distribution using normality test Kolmogorov-Smirnov test and obtained the result that all three groups come from populations with normal distribution, (2) Homogeneity test using test Levene Statistic, result that the three groups have homogeneous variances.

Data collection technique is a test method, consisting of pre test and post test of Science Literacy and interpersonal intelligence questionnaire. In addition, to support quantitative data, conducted interview techniques and documentation in the form of photos of student learning outcomes and photos of student activities during the learning took place.

RESULTS AND DISCUSSION

Preliminary Test of Science Literacy

Statistical test analysis for pretest data processing, processed using SPSS 17, which includes normality test and homogeneity test. The results of the analysis is presented in Table 1.

Table 1. Normality Test Results

Pretest	Nosmality test
Eksp 1 (N 23)	0.080
Eksp 2 (N 15)	0.200
Eksp 3 (N 26)	0.145

Based on the data contained in Table 1 above, the normality test results indicate that the three classes are from a normally distributed population.

After testing the normality, then the homogeneity test is done to find out the homogeneous sample or not. The results of Levene Statistic test analysis can be seen in Table 2 below.

Table 2. Homogeneity Test Results

Levene statistic	df_1	df_2	Sig.
1.048	2	61	0.357

Table 2 shows that the significance value is more than 0.05, then the initial test data of

Literacy Science ability comes from homogeneous population.

Analysis of Science Literacy Test Results

According to Rusilowati (2014) that to measure the quality of the item is through the level of difficulty and distinguishing power problem. After the analysis of the level of difficulty and distinguishing power of the problem then obtained a Literacy Science skills test in the form of a description of 10 questions about pretest and 13 posttest questions that have been tested.

Overall, the average pretest, post-test, and gain values of Literacy Science with the application of Two Stay Two Stray assisted visual media model can be seen in table 3 below.

Table 3. Average *Pretest, Posttest,* and *N-Gain* Literacy Value

Class	Pretest	Posttest	N-Gain
Exp 1 (N 23)	53.87	74.83	0.37
Exp 2 (N 15)	52.33	67.67	0.287
Exp 3 (N 26)	58.75	73.31	0.360

From Table 3 we get the average pretest grade of Class V Class Experiment 1 53.87 while posttest 74.83 with N-gain 0.37; average pretest grade of Experiment Class 2 52.33, while posttest value 67.67, and N-Gain 0.287; and the average pretest grade of Experiment Class 3 58.75, while the average posttest score of 73.31 with N-Gain is 0.360.

From Table 3, it can be seen that the average Literacy ability of Classical science class experiment 1 and 3 more than minimum completeness criteria set by the school that is 70. As for the average classical literacy ability of science classroom students experiment 2 is still less than minimum completeness criteria.

Furthermore, the classical completeness test to see the average student by using the z-test. Based on the calculation obtained value Z_{value} = 3.18 while Z_{table} = 3.15 so $Z_{value} > Z_{table}$ it can be stated that 75% of students thoroughly in classical.

After the three classes were treated three times in which the last meeting held posttest to measure the Science Literacy of students with the form of problem description of 13 questions and the third class is given the same problem, the result obtained that there is an increase in Literasi Science. However, in Experiment Class 2, the average score has not met the KKM assigned by the school.

According to TIMSS (2017), there are 3 domains to measured the cognitive abilities of Science, they are knowing, applying, and reasoning. In this research there are 7 indicators applied based on TIMSS three domains. The domain knowing indicators include: (1) remembering facts/concepts of light, (2) describing the nature of light, (3) providing examples of the use of mirrors in everyday life. Aplying domain indicators include: (4) comparing concave mirrors and convex mirrors, (5) interpreting information to create drawings/tables, (6) explaining the everyday phenomena associated with the nature of light. The reasoning domain indicator is (7) make a conclusion.

Table 4 shows the scores of students based on their respective domains.

Table 4. Obtaining Scores per Science Literacy Indicator

Domain	Indicator	Score	Average
Knowing	Considering the facts/concepts of light	199	3.11
	Describe the nature of light	183	2.86
	Provides an example of the use of mirrors in everyday life	177	2.77
Applying	Comparing the concave mirror and the convex mirror,	233	3.64
	Interpret information to create images/tables	174	2.72
	Explain the everyday phenomena associated with the nature of light	178	2.78
Reasoning	Make a conclusion	117	1.83

Based on Table 4, was obtained that the highest score is 233 and the average of 3.64 with a maximum score per indicator 4, obtained by the students in the indicator compares the concave mirror and a convex mirror, while the low score

students are on indicators make inferences with the score 117 and an average of 1.83.

Salamah & Rusilowati (2017) which stated that one of the scientific literacy abilities is ability to use scientific knowledge to describe conclusions based on scientific facts.The low ability of Literacy Science in these students can be caused since students are not accustomed to working on the problem in the form of a test that requires accuracy and ability to understand the contents of reading. Students need to be thorough to read, understand the text content and logical reasoning ability to be able to complete the Science Literacy test (Rusilowati, et al. 2017).

Another difficulty is dealing with students experience in making conclusions from experiments that have been done. Students should be mentored by the teacher to be able to make the appropriate conclusion. In addition, students are not accustomed to do lab working in groups so that they have difficulty in following the work steps in the Student Worksheet. Therefore, it is important to present the material in the Student Worksheet as a student stimulus in concept building (Ariningtyas, et al. 2017). Furthermore, in preparing the material for the students need to be adjusted to the level of understanding and age of the reader to facilitate understanding. According to Ayodele cited by Cristina, et al. (2016) states that the teaching materials shown to students must meet the level of student understanding because this affects the interest of students to read the science materials.

Research by Rusilowati, et al. (2016) mentions that several factors that led to the low mastery of science students to the category of science as a way to investigate are: (1) students rarely perform laboratory activities, (2) Students do not understand the terminology in the investigation activities such as independent variables and dependent variables, and (3) Students spend more time memorizing. This is also consistent with Leonard's statement cited by Maturradiyah & Rusilowati (2015) that science learners should emphasize student activities, reduce fact-taking activities, focus more on process activities to gain concepts and spend more time in laboratories or fieldwork .

Implementation of Two Stay Two Stray cooperative model with visual media aid has a positive impact on the improvement of students' science literacy ability. This is relevant to the research that has been done by Muhammad Nurhusain (2017), Kusumaningrum, et al.(2015), Sugesti & Subanti (2014) which shows that learning outcomes with the Two Stay Two Stray learner model is higher than through the direct learning model.

Analysis of Interpersonal Intelligence Questionnaire

Of the several characteristics mentioned by experts, but in this research there were six indicators of interpersonal intelligence to be used, namely (1) have many friends, (2) have leadership spirit, (3) like to help friends, (4) empathize with the feelings of others, (5) like working in groups, and (6) communicate well.

In this study, to describe interpersonal intelligence, researchers used questionnaires. Items come from predefined indicators and generate scores. Interpersonal intelligence questionnaire consists of two groups of items, ie items that favor favorable and unfavorable items. This questionnaire provides a yes and no answer.

The questionnaire is used to determine the level of students' interpersonal intelligence to categorize the students into high, medium, and low interpersonal intelligence categories and to be considered in grouping students into study groups. The questionnaire given to the students consists of 21 statements with yes/no answer choices.

The result of questionnaire of interpersonal intelligence is then used as consideration for the researcher in dividing the students into study groups when applying cooperative learning model of Two Stay Two Stray aided vsual media.

Here in Table 5 below comparison of increase in Literacy Science based on level of interpersonal intelligence were presented.

Table 5. Increased Literacy Results of Science Based on Interpersonal Intelligence Level

Interpersonal intelligence	Science Literacy		
	Pretest	Posttest	Gain
High	75.58	87.33	0.41
Medium	58.01	75.72	0.36
Low	42.9	58.64	0.30

The data in Table 5 above shows that students who have high interpersonal intelligence get a better score compared with students who have moderate and low interpersonal intelligence. This is in accordance with the results of Wahyuningrum (2017) study which states that interpersonal intelligence in this case that intelligence in working together, communicate, and interact to give a positive effect on learning outcomes. This statement is also supported by the results of research Amitha (2016) which states that there is a significant relationship between interpersonal intelligence with learning outcomes. That is, if the higher the interpersonal intelligence, then the results will be higher learning also.

Furthermore, the research also conducted interviews to some students who have been categorized into high, medium, and low interpersonal intelligence based on the questionnaire results to better understand the factors that affect students' intepersonal intelligence. According to Boeree cited by Monawati (2015) there are several factors that influence one's interpersonal intelligence, among them, the family environment, nutrition, and individual life experiences.

Meanwhile, according to Wahyuni, et al. (2016), the level of interpersonal intelligence someone is not influenced by heridity factors, but influenced by the environment. This is because interpersonal intelligence is altered and enhanced. Interpersonal intelligence is more a process of learning from everyday experience. Therefore, it takes the direction of parents and teachers in developing the students' interpersonal intelligence.

Based on the results of interviews conducted, obtained data that there are 3 factors that affect students' interpersonal intelligence. These factors are family factors, peer factors, and school factors.

Family Factor

The family has a strong influence on the development of the student's personality. Things that can influence student behavior from family factors include parenting, relationships between family members, and family economic conditions. Based on results of questionnaires and interviews with students, finding that students right obtained which have a high degree of interpersonal intelligence and were on average come from families who have good communication. While students who have low interpersonal intelligence, come from families whose parents are busy working so that they lack interaction and communication.

Peer Friend Factor

In addition to family factors, other factors that affect the students' interpersonal intelligence is a factor of peers. At the age of primary school, students interact more with peers and compete for acceptance in a group of friends. Unacceptable students in a group of friends tend to experience difficulties in terms of socializing and communicating.

School Factor

In the school environment, in addition to learning new knowledge students also interact with teachers and other students. Students with high interpersonal intelligence tend to be easily accepted within groups of friends and can easily adapt. Students do not experience difficulties in terms of working together in discussion groups and communicating.While students with low interpersonal intelligence experience difficulties when working in groups and conduct discussions.

Yalçın, et al. (2017) stated that student achievement in school is influenced by parental involvement and friendship relationships in schools. Yalçın findings show that students with parents who are involved in school activities and have good communication will have a positive impact on student achievement. While students who experienced harassment at school will have a negative impact on academic achievement.

Furthermore, the application of co-operative learning model Two Stay Two

Stray assisted visual media can train students in terms of social interaction, communication, and cooperation so that will provide better learning achievement compared to the lesson with direct learning (Zainuddin, 2014).

According to Nurmasdalifah (2017), Two Stay Two Stray cooperative learning model can help students establish friendships by sharing information and working together so as to train students in developing social skills. Unlike the cooperative model in general, the learning model Two Stay Two Stray provides an opportunity for students to discuss and sharing the results of his group discussions with other groups. In the model Two Stay Two Stray cooperative learning, students will learn to appreciate each other's opinions. In addition, students will also learn to express the opinions of students with peers. Award from other students will be able to build students' self-confidence as well as motivate students to be able to express ideas and opinions of students (Sulisworo & Suryani, 2014).

CONCLUSION

Based on the research that has been done, the proficiency profile of Science Literacy of MI students can be improved by the application of Two Stay Two Stray model with visual media aid. However, in order to improve the science literacy ability of MI students, teachers are encouraged to start teaching materials using various strategies that are associated with Literacy Science, for example through experimental activities that stimulate students to think in high order. Teachers are also encouraged to use the learning media in delivering the material because with the media learning will help students to understand the material being taught.

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