



The Impact of Science Learning Multiliteration Model Based on Futuristic Pedagogic Approach to Metacognition Ability of Basic School Students

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Abstract. Developing metacognition abilities is one of the main goals in education. The ability of metacognition is one of the abilities that a person must have in the 21st century. The purpose of this study is to describe the impact of implementing a scientific multiliteration learning model on the metacognition abilities of elementary school students. The research method used in this study is a quasi-experimental method. The number of samples of this study were 39 students. Data were collected using an open-ended question test to measure the metacognition abilities of elementary school students. Data were analyzed through normality test, homogeneity test and t test using SPSS version 20.0 for windows. Based on the results of the study, it was found that the pre-test score of metacognition ability of elementary school students was 36.15 while the post-test score of metacognition ability of elementary school students was 83.84. Based on the results of the t test using paired sample test results obtained that $p = 0.00 < 0.05$ means that there are significant differences in the metacognition abilities of elementary school students between before and after treatment using scientific multiliteration learning models. That is, the scientific multiliteration learning model has a significant impact in developing the metacognition abilities of elementary school students.

Keywords: Metacognition Ability, Scientific Multiliteration Learning Model, Futuristic Pedagogic Approach

INTRODUCTION ~ Today changes in cultural dynamics that are increasingly developing a significant impact on all aspects of the constellation of life, including education (Trilling & Fadel, 2009; Pullen & Cole, 2010; Koustulas, 2010; Tilaar, 2015; Herlambang, 2018). Tilaar (2016) explains the act of education not only developing the ability of human reason but also human reasoning, namely building ethical people. Thus, education as a praxis is aimed at ethical-humanist values. This is in line with the concept of Freire (2008) which states the educational process is a unity of action and reflection. Education is a reflection of various actions or actions to educate people in an effort to humanize their

culture. Therefore, culture itself is a continuously changing process of education which is a united action / reflection will continue to change and develop (Tilaar, 2012).

In connection with the above, efforts to implement education must be based on the dynamics of cultural life that are no longer in the local format. This means that educational orientation must be able to give birth to people of education with 21st century competence. This has significant implications, in the development of learning that must be oriented towards efforts to equip education personnel with 21st century competencies. Trilling & Fadel (2009) revealed that in the 21st century



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learning must be oriented to the effort to supply 21st century competencies including life and career skills, learning and innovation skills, and information, media and technology skills. Apart from the opinion of Trilling & Fadell, further Binkley, et al. (2012) suggested that there are ten skills that must be possessed in the 21st century that are classified into four competencies. These skills are: creative thinking skills, critical thinking, metacognitive thinking, communication, collaboration, information literacy, ICT literacy, citizenship, work and career, and individual and social responsibility skills.

In connection with some of the expert opinions above, various competencies must be an objective in education, one of which is the ability to think metacognition. The term metacognition gained significant recognition in the 1970s from Flavell's early work that defines metacognition as cognition about cognition or thinking about thinking (Hartman, 2001; Hofer & Sinatra, 2010; Larkin, 2006; Zohar & David, 2009). However, over time metacognition has been redefined by various researchers in more specific ways. Wilson, & Bai, (2010), revealed that metacognition can be categorized into two main parts, namely knowledge of cognition and regulation of cognition. Knowledge about cognition refers to the ownership of knowledge and understanding while the regulation of cognition refers to the control and proper use of that knowledge.

Based on the above, efforts to implement education oriented to the 21st century competency development can be done through the development of learning through the application of the Multiliteration model.

The multiliteration model is learning oriented to efforts in building students' insights and understanding so that they are able to develop thinking skills (critical, creative, problem solving and metacognition) that are based and developed through socio-cultural backgrounds (Giampapa, 2010; Hesterman, 2011; Atlas 2013; Cope, & Kalantzis, 2015; Abidin, 2016; Herlambang, 2017; Irianto 2018; Hendriani, 2018).

Related to the above, the multiliteration model is believed to be the right concept to improve the quality of education and learning in the Indonesian context (Abidin, 2015). Furthermore, Abidin (2015) affirms that multiliteration is a multicultural, multicontext and multimedia education and learning concept that can be used in any curriculum that applies in Indonesia. The concept of multiliteration can be used as one of the assumptions of an ideal educational practice in order to answer all the challenges of education in the 21st century, so based on that, to grow students' abilities and skills optimally, learning should always carry the development of multiliteration concepts in various subject matter. This is in line with the opinion of Greenleaf, et al. (2010) which states that "We must think strategically about the



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integration of literacy development across subject matter domains if we expect to develop students' multiple capacities". In connection with this, Concannon-Gibney and McCarthy (2012) based on their research, concluded that "Multiliteracies education plays a key role in science achievement". In other words, multiliteration education is the main key in the achievement of science to prepare students who have 21st Century skills.

METHOD

The purpose of this study is to explain the impact of scientific multiliteration learning models on the metacognition abilities of elementary school students. The method used in this study is a quasi-experimental method with Non-equivalent pretest posttest control group design. The sample of this study was 39 students.

This research instrument used a test instrument in the form of open questions and assessment rubrics. This test instrument to measure the metacognition ability of elementary school students. This research instrument has been through a process of validation testing by several experts to see the suitability of the test instrument and the assessment rubric used. The result of this validation test is that this instrument was declared eligible to be used to measure the metacognition abilities of elementary school students.

The procedure of this research is firstly to be done pre-test to find out the students' initial abilities. The treatment is then carried out by applying a scientific multiliteration learning model. After treatment, then post-test is performed to determine the metacognition ability of elementary school students after being given treatment. After the data is obtained, the data are analyzed through normality test, homogeneity test, and t test to find out the differences in metacognition abilities between before and after learning using scientific multiliteration learning models. Data processing in this study was assisted with the SPSS program version 20.0 for windows.

RESULT AND DISCUSSION

This section explains the findings of the metacognition ability of elementary school students through the implementation of scientific multiliteration learning models.

1. Metacognition Ability of Elementary School Students

An explanation of the metacognition abilities of elementary school students between before and after treatment using a scientific multiliteration learning model is explained in detail in the section below which is as follows.

a. Pre test Results



Table 1. Pre test Results

Test type	N	Min	Max	Mean	SD
Pre test	39	25	75	36.15	9.491

Table 1, shows that the metacognition ability of elementary school students before being given treatment using a scientific multiliteration learning model is included in the lack category. This can be seen from the average score obtained by students in the amount of 36.15. The minimum score of students in this pre-test data is 25 while the maximum score obtained by students is 75.

b. Post Test Results

An explanation of the metacognition abilities of school students after being treated using a scientific multiliteration learning model is explained in detail in the section below which is as follows.

Table 2. Post test Results

Tipe Tes	N	Min	Max	Mean	SD
Pre test	39	65	100	83.84	9.209

Table 2, shows that the metacognition ability of elementary school students after being given treatment using a scientific multiliteration learning model is included in both categories. This can be seen from the average score obtained by students in the amount of 83.84. The minimum score of students in this post-test data is 65 while the maximum score obtained by students is 100. The standard deviation in this post-test data is 9,209. From this explanation it is

clear that the scientific multiliteration learning model has a positive impact on the metacognition abilities of elementary school students. The learning stages of the scientific multiliteration model encourage students to learn by using scientific stages that are enriched with the concept of multiliteration so that students have high understanding and can develop their metachogical abilities.

. Increased Metacognition Ability

Table 3. Comparison Results

	Pre test	Post test
Mean	36,15	83,84
Mean Difference	47.69	



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Std. Deviation	9.491	9.209
Normality tes	0.054	0.407
Homogeneity test		0.582
Paired sample test		0.00

Table 3 shows that the metacognition ability of elementary school students obtained an average score of 36.15 with a standard deviation of 9,491. The pre-test normality test results revealed that the significance value of $0.054 > 0.05$ means that the data is normally distributed. While the post-test results revealed an average score of 83.84 with a standard deviation of 9,209. The post-test normality test results revealed a significance value of $0.407 > 0.05$ meaning that the data is also normally distributed. Regarding this explanation, because the two data are all normally distributed. Then the next analysis using homogeneity test. Homogeneity test results indicate that the significance value of $0.582 > 0.05$ means that both data come from the same variance or in other words homogeneous. In line with this, because the two data are normally distributed and homogeneous, the next analysis is parametric test using paired sample test to determine the difference between pre-test and post-test data. Based on the results of the t test using paired sample test it is known that the significance value of $0.00 < 0.05$ means that there is a significant difference in the metacognition skills of elementary school students between before and after treatment using a

scientific multiliteration model based on a futuristic pedagogic approach.

From the explanation above, the metacognition ability of elementary school students has increased significantly after being treated using a scientific multiliteration model based on a futuristic pedagogic approach. Evidence that the model is effective in improving students' metacognition skills can be seen from the difference in the average score of pre-test and post-test that is equal to 47.69 meaning that the increase in the average score obtained is very large.

Increased metacognition ability of elementary school students because the stages of scientific multiliteration learning models encourage students to learn to use scientific stages enriched with the concept of multiliteration so that learning becomes more meaningful and students can gain a high understanding. In addition, the stages of the scientific multiliteration learning model can also improve the metacognition abilities of elementary school students. (Alexander, DePalma, & Ringer, 2016; Allison & Goldston, 2018).

Starting with the explanation above, a scientific multiliteration learning model based on a futuristic pedagogy approach can develop metacognition skills of



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elementary school students because this multiliteration model is designed to answer the needs of skills that pose challenges to education and life in the 21st century. Multiliteration comes as an innovative learning approach that integrates the application of language skills with skills using information and communication technology. In addition, multiliteration is a concept of learning that does not only focus on a partial subject, but rather focuses on the construction of competencies and skills by involving cross-disciplines. In addition, the multiliteration model also emphasizes learning experiences that are meaningful for students. Learning experiences gained through the thematic-contextual learning process in accordance with the situation of students' cultural life. Learning that emphasizes effective and efficient learning experiences can develop students' metacognition skills (Cope & Kalantzis, 2005; Bianco, 2000).

In line with the explanation above, the scientific multiliteration model encourages students to gain a deeper understanding of the material being studied. This is because the learning steps that are applied are scientific steps. In this case, the cognitive aspects of students develop more through the stages of a scientific multiliteration model. Furthermore, the multiliteration model has had a positive impact on students through learning steps that require students to think scientifically. The impact of scientific thinking activities that are enriched with multiliteration will strengthen

students' knowledge, so students have high understanding (Allison & Goldston, 2018; Iyer & Luke, 2010).

The stages of a scientific multiliteration model encourage students to set the problem that they want to study independently. Problem determination by involving students in decision making will increase student motivation in following the learning process and make students more responsible for the tasks that must be done (Bonyadi & Zeinalpur, 2014). The multiliteration model emphasizes the learning process using multimodal concepts. This multimodal concept can help students understand the material being learned easily. In addition, multimodal concepts in learning will give an interesting impression to students because students will be rich in learning experiences.

CONCLUSION

The results showed that the metacognition ability of elementary school students increased significantly after being given learning using a scientific multiliteration model based on a futuristic pedagogic approach. This means that the stages of a scientific multiliteration learning model based on a futuristic pedagogic approach are effective in improving the cognitive abilities of elementary school students. The multiliteration learning model has implications for the learning process, namely increasing learning activities, developing 21st century students' skills, and improving students' thinking skills.



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