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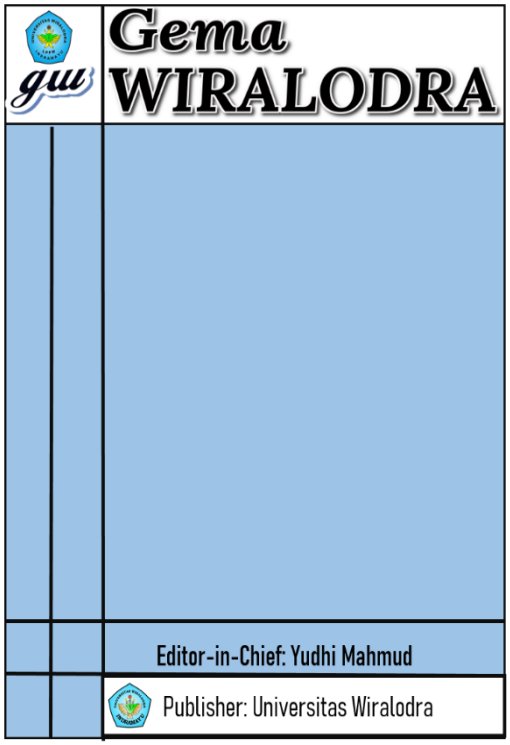

Project Based Learning (PjBL) and Gender Roles: Impact on Creativity and Environmental Literacy

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Project Based Learning (PjBL) and Gender Roles: Impact on Creativity and Environmental Literacy

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Abstract
The ability to think creatively and environmental literacy of students in mathematics learning is a skill that needs to be mastered by students. The purpose of this research is to examine the influence of the PjBL learning model on creative thinking skills and environmental literacy, considering gender differences. This research is a quantitative study of the Quasi-Experimental Design type where in this study there are two classes, namely the experimental class which will use the PjBL learning model and the control class with the expository learning model. The subjects of this research are eighth-grade students at SMP IT Budi Luhur, with a total population of 58 students. The sample in this study is class VIII A as the experimental class and class VIII B as the control class using the expository model. The data collection techniques were in the form of tests and observations. Hypothesis testing in this study used a two-way Manova test. (Two way manova). the results of the research and discussion concluded that the ability to think creatively and environmental literacy using the PjBL learning model is better compared to using the expository learning model.

Keywords: Ability Think Creative, Literacy Environment, PjBL Model, Gender Differences

1. Introduction

Education has a role important for every individual, thing This in line with Article 31 of the 1945 Constitution which states that every human being has the right to receive education. Education is something that is planned to realize a learning process, so that students can develop their potential and have spiritual strength, personality, intelligence, noble morals and skills needed by students, society, nation and state. Education is one of the factors that supports human intellectual change, therefore education is important for the progress of a country. With a good education system, good human resources are also produced.

Conscious and planned efforts in preparing students are carried out by educators or teaching staff, teaching staff or teachers are one aspect that can provide a role in the world of education. Teachers help students in expanding their knowledge. According to Dewi MAC in the research of Bambang Sri Anggoro, Nukhbatul Fairy Tale Haka and Hawani that the achievement of learning objectives and a learning atmosphere that is not boring can be obtained if students actively interact with learning resources arranged by educators (Sri Anggoro et al., 2019) . However, the absorption of knowledge is not only formed from the learning outcomes given and the teacher's education, the absorption of knowledge formed from the teacher's education, but students must also be involved in the learning process.

This is in line with the characteristics of Islamic teachings in the fields of science and culture as stated in the Holy Verses of the Quran, Surah Al- Alaq 1-5:

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ٱقۡرَأۡ بِٱسۡمِ رَبِّكَ ٱلَّذِي خَلَقَ. خَلَقَ ٱلۡإِنسَٰنَ مِنۡ عَلَقٍ. ٱقۡرَأۡ وَرَبُّكَ ٱلۡأَكۡرَمُ. ٱلَّذِي عَلَّمَ بِٱلۡقَلَمِ. عَلَّمَ ٱلۡإِنسَٰنَ مَا لَمۡ يَعۡلَمۡ .

Meaning: "Read in the name of your God who created. He created humans from a clot of blood. Read it and your Most Gracious Lord. Who teaches humans about something they don't know yet. "

The holy verse of the Qur'an, Surah Al- Alaq, which describes the command to read from Allah SWT, humans are not only required to read, reading becomes an activity that must be done by every individual as a creature of His creation to become a useful human being and be able to achieve life goals. Reading activities are continued with writing activities to find out the knowledge that can be learned and developed for the good in the future. For that, every human being, especially students, needs to be able to read, the process of learning to read can be learned in education. Through education, students will gain knowledge that they do not yet know such as religious knowledge, social sciences, natural sciences and other sciences. As conveyed in Baiquni, besides reading in the sense, it can also mean studying, observing, comparing, measuring, describing, analyzing, and inductive conclusions, all of these methods are used in the process of learning something. (Nata, 2016)

The learning process is one of the important factors in achieving learning objectives (Anggoro et al., 2019) . Activities obtained through learning activities that occur in activities carried out by educators with students. Learning activities that can be carried out by educators must be able to prevent students from getting bored, so as an educator must be able to master the material well, not only that, but educators are also able to use methods that can support learning objectives. The holy book of the Qur'an contains verses related to various educational methods such as lecture methods, questions and answers, discussions, demonstrations, assignments, examples, habits, field trips, stories, punishments, advice, and so on (Anggoro et al., 2019) .

Factor affecting success whether an educational process, one of which is is a learning process that takes place in the classroom specifically eye lesson mathematics. This is in line with Rany Widyastuti et.al's research, namely *"Mathematics is one of the useful lessons and plays an important role for oneself and others. Mathematics is the study of how to count and measure things with numbers and symbols"* which means mathematics is one of useful and holding lessons role important for self yourself and others. Mathematics is the science that studies method counting and measuring something with numbers and symbols (Widyastuti et al., 2020) . In the research of Bambang Sri Anggoro , Nurul Puspita, Dona Dinda Pratiwi et.al, namely *"Mathematics learning in formal education is divided into several parts (levels), namely elementary school, middle school, and college"* which means learning mathematics in formal education is divided become a number of section (level) namely school elementary school middle school , and college tall (Anggoro et al., 2021) .

Acting professionally in carrying out the tasks of educating, teaching, guiding, directing , training, assessing, and evaluating, the process and learning outcomes of students, providing learning services based on individual characteristics and stages of mental growth and development of students, developing an active, creative, effective and enjoyable learning atmosphere. (Suparyanto and Rosad (2015, 2020)

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An educator needs to carry out his/her duties and obligations professionally. This can be seen in the results of the decision of the XXI PGRI Congress in 2013, namely as an educator in carrying out his/her duties, educators must act professionally. Conscious and planned efforts made as an educator to create an atmosphere of activities to gain knowledge and the process of gaining knowledge suggest that students can act actively to develop their potential and hone their skills so that they are able to create students who are needed for themselves, the community, the environment, the nation and the state.

The basic capital that students must have to face the progress of the times in the current era of globalization which continues to develop includes the ability to think creatively. In addition, the difficulty of students in understanding the material and the demands of learning completion make them more likely to choose to memorize practical formulas. Students feel helped and facilitated when using practical formulas to solve math problems (Kusuma et al., 2018) . This makes a lack of ability think creative participant educate become. Based on the creativity group, students can be divided into two, namely fast creative students and normal students. Fast students will feel interested in solving problems, and more confident, and dare to act in facing problems. So, schools need to facilitate by providing opportunities so that students can improve their creative thinking skills. Ways to develop student creativity can be found through learning activities.

Low creative thinking skills and environmental literacy were also found in SMP IT Budi Luhur, Dente Teladas sub-district, Tulang Bawang district, Lampung province. This can be seen from the results of the pre- research test of creative thinking skills and environmental literacy related to mathematics lessons. Based on this description, the objectives of this study are: For see existence influence of learning models PjBL to ability think creative and literacy environment reviewed from difference *gender*

2. Method

The research method is basically a scientific way to obtain data for a specific purpose. (Sugiyono, 2019) The type of research that can be used in this study is Quasi Experimental Design where in this study there are two classes, namely the experimental class that will use the PjBL learning model and the control class with the expository learning model. This study is a quantitative type of research, because the research data is in the form of numbers and the analysis uses statistics.

The design that will be used in this research is a posttest-only design control design, with the following design:

Table 1.
Research Design

Group	Treatment	Posttest
Experiment	X	T_1
Control	-	T_2

Information:
X : Treatment by applying the PjBL model
- : Treatment by applying the expository learning model

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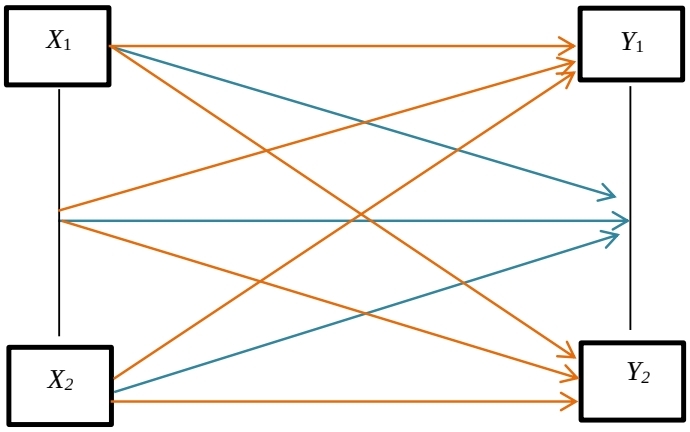
T_1 : Posttest (final test) on creative thinking skills and environmental literacy and gender differences questionnaire in the experimental class
T_2 : Posttest (final test) on creative thinking skills and environmental literacy and gender differences questionnaire in the control class

Figure 1
Relationship Between Variables Free and Bound



Information:
X_1: PjBL Learning Model
X_2: Gender Differences
Y_1: Creative Thinking Ability
Y_2: Environmental Literacy

Above section is in accordance with the formulation of the existing problem, namely

a. PjBL learning model (X_1) on creative thinking skills (Y_1) and environmental literacy (Y_2) simultaneously.
b. Gender differences (X_2) on creative thinking skills (Y_1) and environmental literacy (Y_2) simultaneously.
c. The PjBL learning model (X_1) and gender differences (X_2) on creative thinking skills (Y_1) and environmental literacy (Y_2) simultaneously.
d. The PjBL learning model (X_1) on creative thinking skills (Y_1) and environmental literacy (Y_2) partially.
e. Gender differences (X_2) on creative thinking skills (Y_1) and environmental literacy (Y_2) partially.
f. The PjBL learning model (X_1) and gender differences (X_2)on creative thinking skills (Y_1)and environmental literacy (Y_2) partially.

When the learning process is complete, students will be given a posttest (final test) to see whether there are differences in creative thinking skills and environmental literacy as well as gender differences taught using the PjBL learning model with the expository model.

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The population in the study was all students of class VII of SMP IT Budi Luhur in the academic year of 2023/2023. In this study, there were two samples used. as a control class with expository learning and an experimental class with the PjBL learning model. The sample in this study was 29 students of class VIIIA (experimental) and 29 students of class VIIIB (control). The data collection techniques that will be used in this study are tests, observations and documentation.

3. Results and Discussion

Research This implemented at SMP IT Budi Luhur learning and research processes implemented in a way look at face. Research This starting on May 13th until May 28, 2024. Research implemented during 4 meetings, and in time a week held 3 meetings in each class. In class experiment Monday, Tuesday and Thursday, for class control that is Tuesday, Thursday and Friday. The stages that were passed through in the research include: stage validation questions and teaching modules by Mr. Yahya Tohiri as a mathematics teacher at Budi Luhur IT Middle School. Then conducted a trial on students Class IX A and trial results question found in the Appendix.

Consisting of of two variables free and two variables bound, where two variables free namely the learning model PjBL and gender differences, and two variables bound that is ability think creative and literacy environment. Population study This is all over student class VIII A and VIII B, where class VIII Aas class experiment with implementing learning models PjBL with total 28 participants students and class VIII B as class control with implementing learning models expository with total 29 participants educate. The material provided in the research is Statistics. The purpose is to measure ability think creative and literacy environment as well as gender differences.

As for the explanation from results research that has been done using a learning model the is:

Table 2.
Output SPSS Multivariate Tests

Effect		Value	F	Hypothesis df	df error	Sig.	Partial Eta Squared
Intercept	**Pillai's Trace**	.988	2124.804	2,000	52,000	.000	.988
	Wilks' Lambda	.012	2124.804	2,000	52,000	.000	.988
	Hotelling's Trace	81,723	2124.804	2,000	52,000	.000	.988
	Roy's Largest Root	81,723	2124.804	2,000	52,000	.000	.988
Learning model	**Pillai's Trace**	.110	3.209	2,000	52,000	0.049	.110
	Wilks' Lambda	.890	3.209	2,000	52,000	0.049	.110

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	Hotelling's Trace	.123	3.209	2,000	52,000	0.049	.110
	Roy's Largest Root	.123	3.209	2,000	52,000	0.049	.110
Gender differences	**Pillai's Trace**	.026	.697	2,000	52,000	.502	.026
	Wilks' Lambda	.974	.697	2,000	52,000	.502	.026
	Hotelling's Trace	.027	.697	2,000	52,000	.502	.026
	Roy's Largest Root	.027	.697	2,000	52,000	.502	.026
Learning model * gender differences	**Pillai's Trace**	.035	.948	2,000	52,000	.394	.035
	Wilks' Lambda	.965	.948	2,000	52,000	.394	.035
	Hotelling's Trace	.036	.948	2,000	52,000	.394	.035
	Roy's Largest Root	.036	.948	2,000	52,000	.394	.035

Tabel 3.
Output SPSS Test of Between-SubjectsEffects

Source	Dependent Variable	Type III Sum of Square	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Ability think creative	469,694	3	156,565	2.117	.109	.107
	Literacy environment	525,712	3	175,237	2,030	.121	.103
Intercept	Ability think creative	285383.862	1	283583.862	3857.978	.000	.986
	Literacy environment	272682.874	1	272682.874	3159.441	.000	.984
Learning model	Ability think creative	376,573	1	376,573	5,091	.028	.088
	Literacy environment	481,476	1	481,476	5,579	.022	.095
Gender Differences	Ability think creative	44,910	1	44,910	.607	.439	.011
	Literacy environment	3,585	1	3,585	.042	.839	.001
Learning model * Gender Differences	Ability think creative	43,745	1	43,745	.591	.445	.011
	Literacy environment	14,343	1	14,343	.166	.685	.003
Error	Ability think creative	2920.536	53	73,972			

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	Literacy environment	4576.288	53	86,307
Total	Ability think creative	296912.111	57	
	Literacy environment	284400.000	57	
Corrected Total	Ability think creative	4390.230	56	
	Literacy environment	5100.000	56	

a. Hypothesis First

Based on Two Way Manova test results use SPSS with see the test results on Wilk's lambda, obtained results that there is influence in a way simultaneous in learning models PjBL to ability think creative and literacy environment. The sig level obtained is not enough from 0.05 which is 0.049 things This show that learning model PjBL influential to improvement ability think creative and literacy environment participant educate.

Project Based Learning Model Learning (PjBL) is an innovative learning method that is centered on students (Student Centered) and places the teacher as a motivator and facilitator, where in this case students are given the opportunity to work autonomously to construct their learning. Project Based Learning Model Learning) students design a problem and find their own solution, so that they can increase students' creativity to come up with their own solutions, making learning activities more meaningful so that they are remembered (Surya et al., 2018).

In the process of activities learning PjBL Lots happen interaction between educator with participant educate or on the contrary. Activities learning that involve doing projects in a way collaborative, starting from fundamental questions, planning project, compile schedule, evaluation learning. Educators share participant educate into 5 groups as for objective from distribution group the is for do the project that will be done. After the educator finished sharing group on participants educate, educator explain material about statistics in convey material educator use language that is easy for participants to understand educate. Educators also submit related questions to life everyday so that participants are educated easily to understand the material taught.

Learning in class with implementing learning models PjBL different with class which uses a learning model expository, learning in class that applies learning models expository tend to be seen saturated now educator explain material, at the time educator explain material Still there is participant students who are still chat with Friend on the same bench and not notice explanation from educators. Therefore, that can know that ability think creative and literacy environment on participants educate not enough maximum compared to participant students who use learning models PjBL. The same thing happened when participant educate requested for do question, only some who work while the others depend on ability their friend. While in the learning process that is carried out with implementing learning models PjBL, each member group sued for

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play a role active in activity discussion, able convey ideas or thinking, and finishing as well as evaluate.

b. Hypothesis Second

Based on calculations performed on inter- test Variants or subject obtained mark sig more from 0.05, namely of 0.502. This shows that No existence influence gender differences towards ability think creative and literacy environment simultaneously.

The second hypothesis states that there are the same results simultaneously in creative thinking ability and environmental literacy for male and female genders. A person's gender during mathematics learning did not have a difference in the posttest results conducted to see the influence of these abilities.

Gender apparently does not affect students' creative thinking skills, which is also in line with research conducted by Riki Riyanto Sambas Astra, et al., which states that gender factors do not have a major influence on the achievement of students' mathematical creative thinking skills in mathematics learning that is carried out. Similar to research conducted by Legowo, in his research stated that both male and female students tend to have the same potential in understanding learning, especially mathematics, in developing their mathematical creative thinking skills. (Legowo, 2017)

Then another reason why gender does not affect creative thinking skills and environmental literacy can be seen during the learning process, both male and female students are equally attentive to the explanations given by the educator.

c. Hypothesis Third

Based on calculations performed using the Two-Way Manova test in the inter-test Variants or subject, obtained sig > 0.05, namely by 0.394 So that H_1rejected. This is my own understanding that t does not exist significant influence between learning models n PjBL and gender differences in influence ability think creative and literacy environment in a way simultaneously. With thus can concluded that hypothesis the third one mentioned that absence interaction of learning models and gender differences simultaneously to ability think creative and literacy environment eye lesson mathematics class VIII at SMP IT Budi Luhur.

There is no interaction between learning models and gender differences simultaneously on creative thinking skills and environmental literacy, namely in the second hypothesis there is no difference, so in this third hypothesis it is also not possible for interaction to occur. The use of the PjBL learning model is effective for creative thinking skills and environmental literacy, but during the learning process, male and female students do not make a difference.

This study also has limitations, including the author only looking at gender differences variables, not looking at other factors that can affect the results of students' creative thinking skills and environmental literacy. In addition, the measuring instrument in this study has quite a lot of questions so that students feel bored to answer, in addition, the use of time that is not optimal has an impact on students who still have

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difficulty showing creativity in their way of thinking, but male students and female students already understand the material that has been taught and are active when participating in learning activities.

d. Hypothesis Fourth

Two Way Manova test using SPSS by looking at the SPSS Tests Output of Between-Subjects Effects obtained that there is a significant difference in the results of creative thinking skills measured by the PjBL learning model and the expository learning model. The level of Sig. obtained on creative thinking ability is less than 0.05, which is 0.0 2 8. This shows that the PjBL learning model influences creative thinking ability. In the environmental literacy row, the Sig value obtained is greater than 0.05, which is 0.022; it can be concluded that this shows that the PjBL and expository learning models influence environmental literacy. Thus, it can be concluded that in the fourth hypothesis there is an influence of the PjBL and expository learning models on creative thinking skills, while there is a difference between the PjBL and expository learning models on environmental literacy individually.

The learning process in the PjBL model provides freedom for students to plan learning activities, carry out projects collaboratively, and ultimately produce work products that can be presented to others. The project-based learning model can bridge students to develop creativity through project-based problem-solving activities (Kusumaningrum & Djukri, 2016) .

Classroom learning by implementing the PjBL learning model to determine the influence on creative thinking skills and environmental literacy is different from classes that use expository learning models , classroom learning that applies the expository learning model in determining the influence on creative skills and environmental literacy is good, but students tend to look bored when the teacher explains the material, when the teacher explains the material there are still students who chat with their deskmates and do not pay attention to the teacher's explanation. Therefore, the creative thinking skills and environmental literacy in students are less than optimal compared to students who use the PjBL learning model. Similarly, when students are asked to work on questions, only a few students work while the others only depend on their friends' abilities. While in the learning process carried out by implementing the PjBL learning model, each group member is required to play an active role in learning activities, can convey ideas or thoughts, and is able to demand students to design, solve problems and make decisions.

e. Hypothesis Fifth

The fifth hypothesis states that there is no partial influence of creative thinking ability and literacy on gender (male and female) of students. This can be seen in the Sig value. on creative thinking ability, which is 0.439, which means it is greater than 0.05. While the Sig value on environmental literacy, which is 0.839, which means it is greater than 0.05. Gender (male and female) apparently has no effect on the posttest score creative thinking skills and environmental literacy.

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Gender does not significantly affect the ability of students, so if male or female students are given treatment, the response and results are the same or there is no difference. In the control class, the expository learning model is applied while the experimental class is given the PjBL learning model treatment and from both classes it can be concluded that there is no significant difference between male and female gender with creative thinking skills and environmental literacy partially.

This is in line with research conducted by Amalia Ulfa, et al., in their research, it was found that there was no real difference between the creative thinking skills of male and female students. (Ulfa et al., 2018) In addition, the results of research conducted by Suprapto, Siti Zubaidah, and Aloysius Duran Corebima showed that gender did not affect students' creative thinking skills, which means that the creative thinking skills of male and female students have the same potential (Suprapto et al., 2018) .

f. Hypothesis Sixth

Based on the calculations that have been carried out, the sig value is obtained on creative thinking ability of 0.445 which means greater than 0.05. Likewise with the sig value on environmental literacy of 0.685 which means greater than 0.05. This shows that there is no interaction between the PjBL learning model and gender on creative thinking ability and environmental literacy partially.

posttest calculation of creative thinking skills and environmental literacy obtained from the class using the PjBL learning model are better than the class using the expository learning model. This can be seen in the table which shows the average, median, mode values in the experimental class are better than the control class. In addition, it can be seen in the PjBL learning process that male and female students are invited to form groups to solve problems given by educators. The existence of discussions and giving problems and solving these problems can develop students' creative thinking skills and environmental literacy.

However, in this hypothesis there is no interaction between the PjBL learning model and gender on creative thinking skills and environmental literacy partially. The inaccuracy of the research results can be caused by several factors, including when students fill in the answers in a hurry, feel bored because the questions given are quite a lot and there is cooperation in working on the test questions. This can affect inaccurate results.

Based on the results of previous research, this study can conclude that creative thinking skills and environmental literacy using the PjBL learning model are better than those using the expository learning model.

4. Conclusion

a. There is influence of learning models PjBL and expository to ability think creative and literacy environment. Ability thinks creative and literacy environment Better with implementing learning models PjBL vs expository

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b. There is no influence gender differences (male and female) towards ability think creative and literacy environment. Because a person's gender at the time of learning mathematics turned out to have no difference in the results of *the posttest* conducted to see the influence of this ability.
c. There is no influence between learning models PjBL, expository and gender differences in simultaneously to ability think creative and literacy environment. The use of the PjBL learning model is effective for creative thinking skills and environmental literacy, but during the learning process, there is no difference between male and female students.
d. There is influence of learning models PjBL and expository to ability think creative and literacy environment in a way individually. Ability thinks creative and literacy environment in a way individually Better with implementing the PjBL model compared to expository.
e. There is no influence gender differences (male and female) towards ability think creative and literacy environment in a way individually. This matter due to Because There is no significant difference between male and female gender in terms of creative thinking skills and environmental literacy individually.
f. There is no influence between learning models PjBL, expository and gender differences (male and female) in general simultaneously to ability think creative and literacy environment in a way individually. Because when students fill in the answers in a hurry, feel bored because the questions given are quite a lot and there is cooperation in working on the test questions. This can affect results that are not accurate.

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