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The Relationship between Critical Thinking Ability and Problem-Based Learning with a Causality Pattern in Learning Improvement

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ABSTRACT

Objective: *The research objective was to identify and analyze the relationship between student ability and project-based learning (PBL) with increased learning, the relationship between critical thinking ability and project-based learning with increased learning, and the relationship between project-based learning and learning improvement. project-based learning mediates the relationship between student ability and learning improvement and mediates the relationship between critical thinking ability and learning improvement.*

Methodology: *This research is a type of quantitative research where it examines the relationship between exogenous and endogenous variables. This quantitative study uses the SEM-SmartPLS 3.0 model and also uses a quasi-experimental design method because it observes two groups, namely the control group and the experimental group.*

Findings: *Based on the results of hypothesis testing using Smart PLS it shows that, H1, H2, & H3, are accepted because the t table value is greater than the calculated t value or has an alpha (α) value less than 5%. Whereas H4, H5, H6, and H7 cannot be accepted (rejected) because their value is greater than 5%. The experimental class showed an increase with the previous average value of 54.31 while the average result after treatment was 78.79 so there was an increase of 24.48. The homogeneity of the data was tested with the homogeneity test of variance with the significance value of 0.693 > 0.05.*

Conclusion: *Student Ability has a significant effect on PBL and learning improvement. critical thinking ability has a significant effect on PBL and learning improvement. PBL has no significant effect on learning improvement. PBL does not mediate the relationship between student ability and learning improvement, and the relationship between critical thinking ability and learning improvement. The ability to think critically in learning to write explanatory texts with causal patterns using the Problem-Based Learning model shows good results. This can be seen from the students' scores in the experimental class that has increased after being given treatment (controlled).*

Keywords: *Student Ability, Critical Thinking; Project-Based Learning; Learning Improvement.*

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INTRODUCTION

A language is a communication tool for humans that is used to interact between parties both orally and in writing. Language can be used to convey information at different places or at different times. Rakasiwi et al., (2014) state that language is one of the main ways to express thoughts, and in all developments, thought always precedes language. Language development is the development of the use of sequences of words and tends to be more effectively used by the wearer. The increase in the existence of language is always studied scientifically in the world of education.

The Indonesian language is a unifying tool for the Indonesian nation, as well as one of the compulsory subjects at all levels of education. Indonesian language lessons are very important to learn in an educational environment (Ministry of National Education, 2003). In the change and development of the 2013 curriculum which is implemented with core competencies in the Indonesian language, one way to improve good and correct Indonesian language skills is through education management and educational programs in schools, especially Indonesian language subjects. Mahsun (2014) states that the scope of Indonesian language subjects in the 2013 Curriculum is text-based learning that can be integrated between literary and linguistic materials.

According to the Ministry of National Education (2003), Indonesian language subjects aim to make students have these abilities in the following descriptions: (1) Communicate effectively and efficiently under applicable ethics, both orally and in writing; (2) Appreciate and be proud to use Indonesian as the language of unity and the language of the state; (3) Understand language Indonesian and use it appropriately and creatively for various purposes; (4) Using the Indonesian language to improve intellectual abilities, well as emotional and social maturity; (5) Enjoy and utilize literary works to broaden horizons, refine character, and improve knowledge and language skills; and (6) Appreciate and be proud of Indonesian literature as the cultural and intellectual treasures of the Indonesian people. Highlighting goal number one above, the author feels inspired to conduct scientific research related to the obligation to improve writing skills, especially in the basic competence of writing explanatory texts with causal patterns. Abidin (2016) stated that writing is a process of expressing ideas in written language. This means, writing an explanation text is not an easy thing to do. For example, in an explanatory text, a person must be able to know the process of occurrence or formation of natural or social phenomena that is around him.

Based on the results of temporary observations and interviews that the author conducted on November 1, 2021, with one of the Indonesian language teachers and the principal of SMPN 1 Kramatwatu in Serang Regency in terms of learning to write explanatory texts, it is indicated that students have not been able to write explanatory texts by paying attention to the elements of construction (statement. general, explanatory sequences, and interpretations); students are less active in participating in lessons; and most of the student's achievements are still below the Minimum Completeness Criteria (MCC) of 75.

According to Kartaningsih (2018), the results of his research explain that students' writing skills are low because the content does not describe complete ideas and thoughts. In addition, Ishak (2014) states that writing skills are generally difficult for students to do. Writing is the most difficult language skill. Likewise, according to Tarigan (2013) which states that writing skills demand experience, time, and opportunity. Producing good writing is not an easy thing to do.

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Tarigan (2013) states that writing is an activity that should be productive and expressive. Through writing activities, we can convey ideas, thoughts, and feelings that can open the gates of knowledge as success. The progress of a nation and a country can be measured by the progress of the nation's writing activities. The amount and quality of written works produced by a country, the more advanced that country's written communication is.

Writing skills can only be obtained through rigorous exercises with mastery of certain concepts. Writing skills are a requirement for everyone, especially for those who move or live in the academic world. The passion and ability to write are also positive phenomena for the civilization of a nation. Tarigan (2013) states that writing can be interpreted as an activity to express ideas by using written language as a medium for delivering messages. Another thing that is no less important to improve writing skills is so that they are easy to understand and interesting in writing form. Why are learning models and media very important in the teaching and learning process? The answer is because both are supporting factors and interrelated with each other that are dominant in achieving the success of learning objectives.

Efendi (2021) explained that the low writing ability of students is due to the lack of creativity in teachers and students. Teachers are less able to stimulate students to pour everything that is in their hearts and minds. Indonesian language teachers tend to provide theories that are rote so that students feel bored and not stimulated by their willingness and ability to write. The orientation of teachers in general is more to the value of the test results in form of theory and not to the process of forming students to be creative in writing. This in turn makes students less likely to train their minds through writing.

Writing plays a big role in teaching and learning activities because it is loaded with values which are the key factors for teachers to know the state of knowledge of students. For students, this can also foster a sense of pleasure, confidence, and the freedom to express their ideas. According to Wasley quoted by Alwasilah (2013), two very important learning strengths can be obtained by humans from writing, namely: (1) Writing is the best way to gather ideas because only by writing can ideas come from reflection and conversation; (2) Writing is a “Mind Clarifier”, in the sense that writing makes our invisible thoughts visible on paper. As we all know, one of the basic competencies regarding writing skills at the SMP/MTs/equivalent level is explanatory writing. Through explanatory texts, some people are able to realize the importance of information based on facts and cause and effect. The substance in the explanatory text is also to explain something to other parties so that it can be used in the context of knowledge that lies behind a phenomenon that occurs in a community.

LITERATURE REVIEW

Theoretical Basis

Explanation Text and Causality

Kosasih (2015) explains that explanatory text is writing that describes the relationship of events or the process of something happening completely. In line with Kosasih, the Ministry of National Education (2017) stated that explanatory texts can be equated with procedure texts or the process of phenomena occurring. In addition, Suherli et al., (2017) state that an explanatory text is an essay that contains complete explanations of a topic related to various phenomena. From some of the statements above, it can be concluded that an explanatory text is a text that describes or explains a phenomenon in detail and comprehensively.

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The explanatory text is composed of linguistic structure and rules. Suherli et al., (2017) state that the structure of the explanatory text includes the identification of phenomena as well as the process of events and reviews. From this text, it is hoped that the reader will get a clear and logical understanding of the background of something. Kosasih (2015) states that to describe the events presented, explanatory texts use many facts based on scientific fields or contain statements that have a causal relationship. Meanwhile, quoted from the Indonesian Dictionary, causality is a matter of cause and effect. Nailufar (2020) explains that causality in an explanatory text is the relationship formed between an event (cause) and the impact (effect) of the event. Just like other paragraphs that function to describe a thing or object, explanatory texts have other characteristics to make it easier for readers to understand the contents of the paragraph by using facts and other data. This will certainly be useful for students, especially in the activity of writing explanatory texts with causality patterns. To start so that students enjoy writing and are able to write explanatory texts with causality patterns, a learning model is needed that can support the learning process so that it can stimulate passive students to become active and unproductive students to become productive.

Student Ability

Hornby (1995) defines ability as the mental or physical power or skill required to do something. Mudjijo (1995) formulates that a student's ability or behavior is an absolute requirement in instructional objectives. Instructional objectives should describe the expected learning outcomes for students after they have taken certain learning activities. Furthermore, Robbins & Judge (2009) state that the overall ability of an individual consists of two groups of factors, namely: a. Intellectual Ability is the ability needed to perform various mental activities (thinking, reasoning, and solving problems). b. Physical Ability is the ability to perform tasks that require stamina, skill, strength, and similar characteristics.

Greenberk & Baron (2013) provide an understanding of ability as a mental and physical capacity to carry out various tasks. So, student ability is closely related to the psychological and physical capacity of a student to be able to carry out learning standards. In other words, student abilities can also be said to be a student's learning ability. Djamaludin & Wardana (2019), argue that learning is a process of changing a person's personality where the change is in the form of improving the quality of behavior, such as increasing knowledge, skills, thinking, understanding, attitudes, and various other abilities. The national education system for the formulation of educational goals, both curricular goals and instructional goals uses the classification of learning outcomes from Bloom (Sudjana, 2016) which broadly divides them into three domains namely the cognitive domain, the affective domain, and the psychomotor domain. In other words, students' abilities use the dimensions of cognitive abilities, affective abilities, and psychomotor abilities.

Problem-Based Learning

Abidin (2016) states that the learning model can be interpreted as a concept that can help explain the learning process, both by explaining thinking patterns and learning action patterns. One of the learning models that can be applied in learning to write explanatory texts is the problem-based learning model. So, problem-based learning is a part of the schools' organizational innovation to create and share knowledge between students and their friends and between students and teachers. This is following the concept of Sidani & Reese cited by Rajak & Rusman (2022) that learning is a key determinant for innovation in learning organization talent

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to create, acquire and share knowledge, and change its behavior to reflect learning and new insights.

Muhson and Mustofa quoted by Krissandi (2018) revealed that the problem-based learning model is a learning model that uses problems as the first step in collecting and integrating new knowledge. Characteristics of the problem-based learning model (hereinafter referred to as PBL) is a learning model that is driven by challenges, open problems, or reality, and the teacher takes the role of "facilitator" of learning. Thus, students are encouraged to take responsibility for their groups and organize and direct the learning process with the support of a teacher or instructor. So, PBL in the student learning approach is a learning model used in the learning process that does not only focus on the teacher but focuses on students. In principle, the PBL model in schools is a problem-based student learning design and seeks its own solutions. In project appraisal, there are at least three things that need to be considered, namely manageability, relevance, and authenticity.

Critical Thinking

Teaching and learning activities (TLA) will not be considered successful if there is no effect on something. Approaches, strategies, methods, or models that are aligned must be following the needs of achieving learning objectives and the potential of students. Therefore, the link between the text and the PBL learning model (chosen by the author) is expected to affect increasing students' critical thinking at the research focus. Thinking has a close relationship with psychology and cognition. Learning to think is the basis for building knowledge, attitudes, and skills in achieving competence. Surya (2015) states that cognitive behavior at a higher or highest level is thinking. It is said so because thinking is a form of recognition by manipulating several concepts, especially in the order of abstract concepts. In line with Hidayati (2015) which explains as follows: "Thinking is part of worship activities if the aim is to get the pleasure of Allah swt, while it will not be worth worship if the basis is not to get the pleasure of Allah swt. This means that thinking is a worship that can stimulate a person's brain and mentality to process several concepts in improving critical thinking skills". Kuswana (2011) states that learning that honors thinking skills is an aspect of strategy in improving the quality of learning that is oriented towards achieving standard results. Krulik quoted by Siswono (2007) states that critical thinking skills are part of reasoning abilities which include basic thinking skills, critical thinking, and creative thinking. So, critical thinking is a skill that helps a person understand the logical relationships between various ideas systematically so that they can be reflected in drawing relevant conclusions. The dimensions used are fluent thinking skills, flexible thinking skills, original thinking skills, and detailed thinking skills (Tiffany et al., 2017).

Learning Improvement

Improving learning is a learning model that provides opportunities for students to be more active and provides more opportunities for students to communicate (Nasution, 1996). So, improving learning is a learning improvement model carried out by teachers to provide opportunities for students to be more active, as well as provide opportunities for students to build effective communication. Improving learning was first developed by Glover Law from America. Improving learning in Indonesia aims to make the learning process efficient, effective, and fun. The dimensions for measuring the success of increasing student learning (learning improvement) are (1) understanding the learning material; (2) understanding learning information; (3) being able to solve questions according to the material (Sudjana, 2012).

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Framework

According to the Ministry of Education and Culture (2017), explanatory texts can be equated with procedural texts or the process by which phenomena occur. Explanatory text is composed of linguistic structures and rules. Therefore, the structure of the explanatory text includes the identification of phenomena and the process of events and reviews. In connection with this, every student needs an innovative model, one of which is problem-based learning. According to Abidin (2016), the learning model can be interpreted as a concept that can help explain the learning process, both by explaining mindsets and learning action patterns. So, one of the learning models that can be applied in learning to write explanatory text is the Problem-Based Learning model. The essence of innovative behavior is that a person's behavior is always creative and has ideas for change (Yasa et al., 2021).

Project-based learning (PBL) is a pedagogical means by which the student controls the learning process, whereas the teacher acts more in the capacity of a facilitator (Bell quoted by Ngereje, 2020). Although various media are using the PBL model, the focus of this study is the effectiveness of PBL in general on the relationship between the ability to write explanatory texts and students' critical thinking skills. There are several studies conducted by Azhima (2022), Pinastiti et al., (2020), Ningsih (2020) show that Problem-Based Learning (PBL) is effectively used in learning to write explanatory texts by junior high school students. Meanwhile, the research results of Herzon et al., (2018), Yuliana et al., (2020), Priawasana and Waris (2019), Pratiwi et al., (2020), Arfiyani et al., (2021) show that PBL has a positive relationship or impact on student's critical thinking skills. So, it is clear that PBL has an important role in improving the quality of learning from the perspective of critical thinking skills and writing explanatory texts for students. PBL is a dimension to measure the success of student learning. This means that measuring learning performance can be done through project-based learning. The opinion of Peter Druker suggests that an effort to improve organizational performance without being accompanied by measurement efforts is the same as an effort that has no control (Saragih & Hermanto, (2022).

To start, so that students enjoy writing and are able to write explanatory texts with a causality pattern, a learning model is needed that can support the learning process so that it can stimulate passive students to become active and unproductive students to become productive. This means that students will get new challenges through solving problems that are organized through PBL. Therefore, cognitive behavior is at a higher or highest level, namely thinking, so recognition can be done through manipulating several concepts, especially in the order of abstract concepts. The phenomenon of Indonesian language teachers at SMPN 1 Kramatwatu indicates that students' thinking skills need to be managed innovatively through learning explanatory texts with a causality pattern using the Problem-Based Learning model. This explanation can be illustrated in the following figure:

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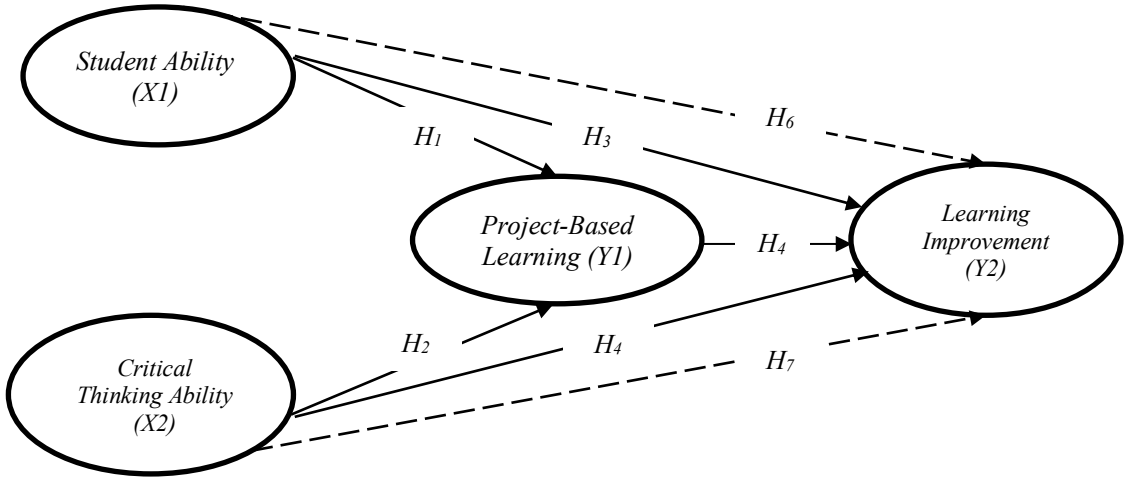

Figure 1. Research Framework

Hypothesis
H_1: Student Ability has a significant effect on Project Based Learning
H_2: Critical Thinking Ability has a significant effect on Project Based Learning
H_3: Student Ability has a significant effect on Learning Improvement
H_4: Critical Thinking Ability has a significant effect on Learning Improvement
H_5: Project Based Learning has a significant effect on Learning Improvement
H_6: Project Based Learning mediated the relationship between Student Ability and Learning Improvement
H_7: Project Based Learning mediated the relationship between Critical Thinking Ability and Learning Improvement

RESEARCH METHODS

This research is a quantitative research because it examines the relationship between exogenous and endogenous variables. This quantitative study uses the SEM-SmartPLS 3.0 model and also uses a quasi-experimental design method because it observes two groups, namely the control group and the experimental group. Experimental research is research that is used to find the effect of certain treatments on others that are controlled (Sugiyono, 2007).

As stated by John W. Creswell quoted by Indrawan and Yuniawati (2014) stated that the research subject in this design runs naturally. For example, research in group learning follows class divisions and uses control groups. The meaning of this statement is that two groups were observed, one group was given treatment while the other was not. Both groups were given two tests, namely before and after treatment. This research was designed using quasi-experimental research with a pair pretest and posttest control design model (matching pretest-posttest control group design).

The population in the study is a source of data. The population is the research subject. The research population that the writer sampled was class VIII students of SMPN 1 Kramatwatu. The research was conducted at SMPN 1 Kramatwatu Jl. Raya Cilegon KM. 8 Kramatwatu - Serang District with the consideration that this school has adequate facilities for conducting research; availability of learning media; and the willingness of the principal/teaching

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team/students to conduct research. To obtain data that is relevant to the research problem, the authors collect data using instruments in the form of pre and post-tests of learning activities and non-tests.

Data collection techniques carried out by the author include observation, tests, questionnaires, and interviews. To measure the quality of the accuracy of the instrument following the aims and objectives of the study, it is necessary to test the validity and reliability of the measurement procedure. In this study, the validity test used was a content validation test using expert judgment which would give a decision on whether the instrument could be used without improvement if there were improvements or a complete overhaul. This was later tested on other class students with the same major. Testing the validity of the data to check the degree of trust or credibility. Furthermore, data analysis was carried out. The analysis was carried out based on data from observation sheets, questionnaires, tests, and interviews.

RESULT AND DISCUSSION

Result

Based on the results of the 2nd outer loading test above, it shows that the convergent validity test with reflective indicators as a whole is significant because the loading factor is part of the variable indicators X1.1, 1.2, X1.3, X2.1, X2.3, X2.4, Y1.3, Y1.5, and Y2.1, Y2.3, & Y2.4. As a rule of thumb, the loading factor used for convergent validity or outer loading is greater than 0.7. In addition, the AVE values of the variables X1, X2, Y1, & Y2 were 0.560, 0.621, 0.725, & 0.595 respectively which were greater than the rule of thumbs value, which was 0.5 (AVE>0.5). This also means that all indicators of exogenous and endogenous variables are appropriate for use in this study. The discriminant validity test was carried out to prove whether the indicators X1, X2, Y1, & Y2 in a construct will have the largest loading factor in the construct it forms compared to the loading factor with other constructs. The discriminant validity test is based on the Fornell-Larcker criterion test which shows that the average variance extracted (AVE) states that: 1) the reflective construction of X1 has a value of 0.748 higher than the correlation value in column X1; 2) the reflective construction X2 has a value of 0.788 higher than the correlation value in column X2; 3) the reflective construction Y has a value of 0.851 higher than the correlation value in column M; and 4) the reflective construct Y has a value of 0.772 higher than the correlation value in column Y. Thus, all items in this research instrument are valid or can be used in research. The next procedure that can be carried out to test discriminant validity is the Heterotrait-Monotrait Ratio (HTMT) method showing the composite reliability value of each variable 0.727 & 0.887 greater than 0.7 while for Y1 it is 0.661 greater than 0.60. This means that all variable indicator instruments X1, X2, Y1, & Y2 can be used or are feasible in this study.

The Inner Model test shows that: (1) the value of the contribution of variables X1 and X2 to Y1 is 0.228 or 22.80%. In other words, exogenous variables can predict Y1 of 22.80% which is in the very moderate category; (2) X1 and X2 to Y2 is 0.335 or 33.50%, meaning that this variable can predict learning improvement (Y2) of 33.50% which is in the moderate category. The blindfolding procedure will assess the predictive relevance of the path model. The results of the blindfolding procedure will generate a cross-validated redundancy estimation construct. SSE is the sum square prediction error while the term SSO is sum squared observation, so the value of Q2 = (1 – SSE/SSO), SEM-SMARTPLS output shows that the Q^2 value is predictive relevance

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to the dependent variable (Y1 & Y2), namely: each is 0.151 and 0.174 > from exogenous variables (X1 & X2). This means the Q^2 value of exogenous predictive relevance that affects endogenous variables is in the moderate category (moderate).
To assess the significance of the predictive model in structural model testing, it can be seen from the t-statistic value between the independent variable to the dependent variable and the path coefficient table variable in the table and the SmartPLS 3.0 PLS bootstrapping output below:

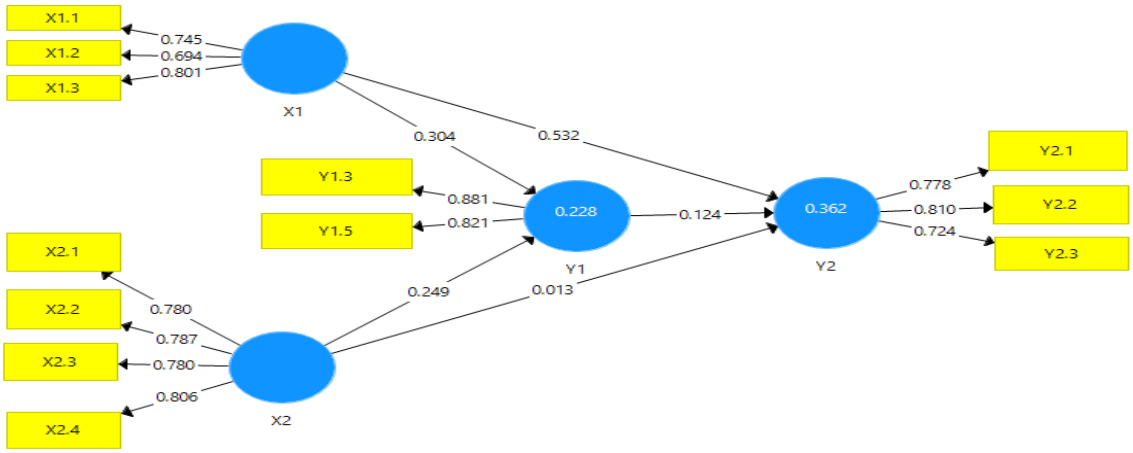

Figure 2. Output Bootstrapping
Sources: Output SmartPLS 3.0, 2022

Based on the output of SmartPLS as illustrated in the figure above, it shows that Hypothesis 1, 2, and 3 are accepted because the respective p-values are 0.027, 0.000, and 0.013 which are smaller than α 0.05 and the respective t statistic values are 2.222, 2,881, and 3.738 which are greater than t table of 1.993. This means that student ability and critical thinking have a significant effect on project-based learning and student ability has a significant effect on learning improvement. While hypotheses 4 and 5 are rejected because their respective p-values are 0.944 and 0.350 which are greater than α 0.05 and the values of the t statistic are 0.120 and 0.935 which are smaller than the t table of 1.993. This shows that critical thinking ability has no significant effect on learning improvement and project-based learning has no significant effect on learning improvement.

Testing the hypothesis (H) of mediation (H6 & H7) shows that the t statistic values X1→ Y1→Y2 and X1→Y1→Y2 are respectively 0.789 & 0.733 which are smaller than the t table of 1.993 and p-value of 0.425 & 0.464 are greater than α 0.05. This implies that project-based learning does not mediate the relationship between student ability and learning improvement and project-based learning does not mediate the relationship between critical thinking ability and learning improvement.

Discussion
To overcome this problem, we need a learning model that can improve students' abilities in learning to write explanatory texts with a causality pattern. This research was specifically conducted using the Problem-Based Learning model. The steps of the problem-based learning model according to Fogarty quoted by Wena (2009) are: (1) The first stage is finding problems; (2) The second stage is problem identification; (3) The third stage is gathering facts; (4) The

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fourth stage is developing a hypothesis; (5) The fifth stage is conducting an investigation; and (6) The sixth stage is perfecting the problems that have been defined. In addition, the activity of writing explanatory texts with a causality pattern is a skill to explain the causes of the events presented. Explanatory texts use a lot of facts based on scientific fields or contain statements that have a causal relationship based on the opinion of Kosasih (2015) and Suherli et al., (2017).

The results of this study indicate that Student Ability has a significant effect on Project Based Learning. This is in line with the concept of learning as a process of changing one's personality where these changes are in the form of improving the quality of behavior, such as increasing knowledge, skills, thinking, understanding, attitudes, and various other abilities (Djamaludin & Ahdar, 2019). A student who can study various learning materials will produce abilities both physical and psychological which in the end will be a problem-based learning process. So, Project-based learning can be improved through students' abilities to perceive and use their knowledge and skills in the learning process. The results are in accordance with the results of research conducted by Widowati (2009) namely critical thinking can affect project-based learning. In addition, the research results of Handayani (2018) show that there is a causal relationship between critical thinking and PBL. In addition, student abilities have a significant effect on app learning improvement. This is the effect of project-based learning because learning abilities can shape student character in communicating with fellow students and teachers. This means that the teacher creates or provides opportunities for students to argue and students are required to use them through their abilities and learning skills.

In addition, based on a quasi-experiment design using suggestive analysis, the ability to write explanatory text (student ability) with a causal pattern using the PBL has increased. The learning outcomes of students who apply the problem-based learning model in writing explanatory texts during the pretest obtain an average score of 54.31 while the learning outcomes of students who apply the PBL model in writing explanatory texts during the posttest obtain an average score of 78.79. Based on the data on the average score of students' abilities in the pretest and posttest activities, there was an increase in the ability to write explanatory texts with a causal pattern. This is in line with the opinion of Muhson and Mustofa quoted by Krissandi (2018) which reveals that the problem-based learning model is a learning model that uses problems as the first step in gathering and integrating new knowledge. With stimulation steps, problem statements, data collection, data processing, verification, and generalization, students can write explanatory texts with causality patterns well. These results can be proven (qualitative study) from the highest percentage of student response questionnaire scores in learning to write explanatory texts with a causal pattern, namely 83.33% and the lowest being 77.78%.

In general, the low writing ability in writing explanatory texts with a causal pattern is indicated by the low creativity of teachers and students (Efendi, 2021). In making explanatory texts with causality patterns, knowledge, and good learning models are needed to be able to understand, identify, and write explanatory texts with causality patterns to make them easier to read. Kosasih (2015) explains that an explanatory text is a text that describes a complete relationship of events or the process of something happening.

So far, teachers have been less able to stimulate their students to put everything on their minds into writing. To overcome these problems PBL is needed in learning to write explanatory texts

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with a causal pattern according to Hanafiah (2012), learning using the PBL model can make it easier for students to master writing competencies, one of which is writing explanatory texts. However, teachers also need to have a strong motivation to continuously guide students through PBL. Because, a person's motivation has a significant influence on individual performance (Qurotalain et al., 2022). In other words, teachers need to involve themselves in the learning process because it can produce learning performance (Asda & Nilasari, 2022). This can be proven from the results of the analysis that the author described earlier, that the ability to write explanatory texts with a causal pattern using the PBL model has increased. The learning outcomes of students who applied the Problem-Based Learning model during the pretest got an average score of 54.31 while the learning outcomes of students who applied the Problem-Based Learning model during the posttest got an average score of 78.79. Based on these data, the average value of student scores increases.

Based on SEM-SmartPLS, the research results show that critical thinking ability has a significant effect on Project-based learning. This is in line with the opinion of Chen (2017) who states that critical thinking is a process of thinking rationally and clearly which involves thinking precisely and systematically by following the rules of logic and scientific reasoning. This means that critical thinking ability which includes fluent thinking skills, flexible thinking skills, original thinking skills, and detailed thinking skills can grow students in producing independent learning processes and have more creativity in understanding learning material. In addition, the teacher will be varied in using teaching methods and consistently focus on student orientation. The results of this study are relevant to the research of Gunawan et al., (2019) showing that there is a relationship between critical thinking and project-based learning. In addition, critical thinking has a positive and significant effect on learning improvement. So, it is increasingly clear that the increase in student learning can be achieved through the way students think critically. In other words, learning improvement also needs to be developed through collaboration between fellow students, and teachers are required to provide support or opportunities for students to express their opinions every time the learning process is carried out, both formally and informally. However, it is different from the results of research on hypothesis five, namely Project-Based Learning (PBL) has no significant effect on Learning Improvement. This means that without PBL, class VIII students of SMPN 1 Kramatwatu have improved their learning through abilities and critical thinking.

Based on the quasi-experimental method using the Problem-Based Learning model, students' critical thinking skills have increased quite well when compared to the previous situation. The increase in the value of students' critical thinking skills can be seen based on the scores of students' post-test results. The results of the critical thinking skills of students who applied the Problem-Based Learning model during the pretest obtained an average score of 53.27 while the results of the students critical thinking skills who applied the Problem-Based Learning model during the posttest obtained an average score of 78.79. Based on these results, the average value of students' critical thinking skills in the pretest and post-test activities has increased.

The learning outcomes of students who apply the Problem-based learning model in writing explanatory texts during the pretest get an average score of 54.31 and the learning outcomes of students who apply the PBL model in writing explanatory texts at that time from the posttest obtained an average score. average 78.79. The learning outcomes of students who apply the conventional model in writing explanatory texts during the pretest get an average score of 53.62

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and the learning outcomes of students who apply the conventional model in writing explanatory texts during the posttest are getting an average score of 74.48. This is in line with the opinion of Hanafiah (2012) who states that learning using the PBL model can facilitate students in mastering writing competencies, one of which is writing explanatory texts with a causal pattern.

In addition to comparing the ability to write explanatory texts with causality patterns between classes using the PBL model and classes using conventional models, the authors compare critical thinking skills in writing explanatory texts with causality patterns between classes using the PBL model and classes using conventional. The results of the critical thinking skills of students who applied the PBL model in writing explanatory texts with a causal pattern during the pretest obtained an average score of 53.27 and the results of students' critical thinking skills who applied the PBL model in writing explanatory text in the posttest got an average value of 78.79. The results of the critical thinking skills of students who apply conventional models in writing explanatory texts at the pretest get an average score of 53.55 and the results of students' critical thinking skills that apply conventional models in writing explanatory texts at the time of the posttest got an average score of 74.13.

After carrying out the study, the authors conducted interviews with student representatives and subject teachers regarding the Problem-based learning (PBL) model for learning to write explanatory texts with a causality pattern oriented to the main ideas and students' critical thinking skills. This interview aims to find out whether there is an increase in the ability to write explanatory texts with causality patterns and critical thinking after using the PBL model. The results of the interviews in this study collected five students who were interviewed about PBL. Students in the experimental class who received learning using the PBL model were interviewed then from the results of the interviews it could be concluded that they understood this PBL model and on average stated that PBL facilitated the process of understanding learning. Therefore, in teaching and learning activities it is necessary to manage education in schools in basic education and higher education. First, schools and teachers must prepare the learning process well, such as readiness to enrich teaching materials, learning media, learning models, and learning methods. The second is teacher and staff organizations in schools need to be prepared in implementing this concept. The third is the right learning model and method are needed since conventional methods seem inefficient in terms of knowledge transformation. The next management activity is to evaluate and monitor learning activities and outcomes.

CONCLUSIONS AND SUGGESTIONS

Students' abilities have a significant effect on project-based learning and have a significant effect on learning improvement. The ability of students to write explanatory texts with a causality pattern using the PBL model is said to be good. This is indicated by the number of student scores for writing explanatory text questions with a causal pattern in the experimental class. The highest score was obtained in the experimental class after being given treatment. Critical thinking skills have a significant effect on Project Based Learning and learning improvement. However, it is different from the results of research on hypothesis five, namely Project-based learning (PBL) has no significant effect on improving student learning. This means that without PBL, Grade VIII students of SMPN 1 Kramatwatu experience an increase in learning through critical thinking skills. The ability to think critically in learning to write explanatory texts with causal patterns using the Problem-Based Learning model shows good

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results. This can be seen from the students' scores in the experimental class that has increased after being given treatment (controlled).

The pretest and posttest scores obtained by students in the experimental class and the control class look different. Even though the results showed that the differences were not that prominent, the data showed that the ability to write explanatory texts with causal patterns using the PBL model in the experimental class showed a better improvement compared to the control class. In addition, the relationship between the ability to write explanatory texts with causal patterns using the Problem-Based Learning model and critical thinking skills obtained a positive and significant correlation coefficient. This shows that the ability of students to write explanatory texts with a causality pattern has a strong positive relationship with students' critical thinking skills. The data presented shows that the better the student's ability in writing explanatory texts with a causality pattern, the better their critical thinking skills will be. However, if the student's ability to write explanatory texts with causality patterns gets worse, then their critical thinking skills will also get worse.

Based on the description of the conclusions above, the suggestions for this research are: (1) Middle School 1 Kramatwatu, Serang Regency needs to improve Project-based learning (PBL) through collaboration between teachers, students, and student's parents. Therefore, teachers need to carry out: Planning related to project objectives, student characteristics, learning strategies and content, and determining achievement indicators; (2) Implementation of planning namely, explaining in detail to students using relevant learning media; and (3) Evaluation of the entire learning process using predetermined indicators. In addition, school management also needs to provide students with an understanding on how to think critically based on classroom learning. This is important because students need to understand in simple terms the steps to improve skills individually and in groups.

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