

The influence of problem-based learning and discovery learning models on learning outcomes

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Abstract

Learning outcomes are a way of seeing the ability of students during learning, when they get low learning outcomes, the learning objectives are less channeled. This can be overcome using learning models. The purpose of this study is to determine 1) The influence of the Problem Based Learning model on learning outcomes; 2) The influence of the Discovery learning model on learning outcomes; 3) The influence of differences between the Problem Based Learning and Discovery learning models on learning outcomes in Economics subjects. This study used a quasi-experimental design. The data population in this study is class XI social studies, at one of the high schools in Bojonegoro Regency for the 2021-2022 school year. By taking a sampling technique, namely purposive sampling. This study was conducted in 2022 from April to May. The instrument in this study is a test of learning outcomes in the form of multiple choice. Data analysis using normality test, Wilcoxon signed rank test, and N-Gain test. The results of this study inform that Problem Based Learning and Discovery learning have a positive influence on learning outcomes. Meanwhile, Problem-based learning and discovery learning has a difference, namely in the Problem Based learning group by 71% higher than the discovery learning group by 55%. Based on the results of the study, it can be concluded that the use of problem-based learning and discovery learning can improve student learning outcomes and help students actively participate in learning. The suggestion for further research is to be able to use a variety of learning models.

Keywords: learning outcomes, problem-based learning, discovery learning

Pengaruh model problem-based learning dan discovery learning terhadap hasil belajar

Abstrak

Hasil belajar adalah cara melihat kemampuan peserta didik selama menangkap pembelajaran, ketika mendapatkan hasil belajar yang rendah maka tujuan pembelajaran tersebut kurang tersalurkan. Hal tersebut dapat diatasi dengan penggunaan model pembelajaran. Tujuan penelitian ini untuk mengetahui 1) Pengaruh model Problem Based Learning terhadap hasil belajar; 2) Pengaruh model Discovery learning terhadap hasil belajar; 3) Pengaruh perbedaan antara model Problem Based Learning dan Discovery learning terhadap hasil belajar pada mata pelajaran Ekonomi. Penelitian ini menggunakan desain quasi eksperimen. Populasi data dalam penelitian ini ialah kelas XI IPS, di salah satu SMAN di Kabupaten Bojonegoro tahun ajaran 2021-2022. Dengan mengambil sampel teknik yaitu purposive sampling. Penelitian ini dilakukan tahun 2022 pada bulan april hingga mei. Instrumen didalam penelitian ini ialah test hasil belajar berupa pilihan ganda. Analisis data dengan menggunakan uji normalitas, uji wilcoxon signed rank, dan Uji N-Gain. Hasil dalam penelitian ini menginformasikan bahwa terdapat Model Problem Based Learning dan Discovery learning memiliki pengaruh positif terhadap hasil belajar. Adapun, antara Problem based learning dan discovery learning memiliki perbedaan yaitu pada kelompok Problem Based learning sebesar 71% lebih tinggi dibandingkan dengan kelompok discovery learning sebesar 55%. Berdasarkan hasil penelitian, dapat disimpulkan bahwa penggunaan problem based learning dan discovery learning dapat meningkatkan hasil belajar peserta didik serta membantu peserta didik ikut secara aktif dalam pembelajaran. Saran untuk penelitian selanjutnya yaitu dapat menggunakan model pembelajaran yang bervariasi.

Kata kunci: hasil belajar, *problem-based learning*, *discovery learning*

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INTRODUCTION

Education is one of the foundations for educating the nation because the measure of the nation's progress is through the level of community education (Ali & Setiani, 2018; Wardani et al., 2018). One of the main things in education is the quality and results of learning (Ashfahani et al., 2020). One of the components that can improve student learning outcomes is the teacher (Febrianti et al., 2019). In education, teachers are one of the indicators of achieving learning objectives. A teacher acts as a model, planner, coach, leader, and guide on the learning process and the role of learners as learning objects (Albeta et al., 2020; Andari, 2020; Yunus & Hua, 2021). In this regard, the main focus of the Indonesian education system is the achievement of learners with life skills to handle their well-being, their families, and the communities around them in the future (Ashfahani et al., 2020). Therefore, it is very important to consider the quality of education to improve the next generation and a teacher as a learning center must be aware of this condition because teachers have the responsibility to improve educational development.

The development of education over the past few years has changed in terms of the learning process and curriculum updates (McCann et al., 2020). This has an impact on the learning process becoming diverse and interesting, the learning environment becoming better with cooperation between individuals, and even techniques and technology in learning (Ismaniati et al., 2016; Rosalina, 2016). Learning itself is a process in which there are interactions, components, and systems that are related to one another, between students and their environmental conditions (Agustina & Rusmana, 2019; Padmi et al., 2020). Pleasant classroom environment conditions can be realized if the learning process is carried out ideally so that it can improve student learning outcomes (Padmi et al., 2020). The learning outcomes of students themselves are one of the indicators of success in a learning process, with appropriate achievement, students will be motivated and foster a spirit of learning in themselves (Aditia et al., 2017; N. Hasanah, 2019; Kistian, 2019)(Aditia et al., 2017; Kistian, 2019). With the learning process, it is hoped that students will be able to get good learning outcomes so that these learning outcomes can be one of the benchmarks for the success of the learning process (Nurmawarni et al., 2022; Suminar & Meilani, 2016). Strategies in learning are one of the things that affect learning objectives if their use is not appropriate, it can hinder these learning objectives (Kaharuddin, 2019).

When low learning outcomes in learners mean showing an inability to deliver the student's educational process to learning objectives (Samputri, 2020). The learning objectives achieved will change behavior in a better direction, besides that also the general purpose of economic social studies learning is to develop students' ability to apply in everyday life (Djonomiarjo, 2018). Learning often used in schools is teacher-centered learning rather than student-focused (Malmia et al., 2019; Yosephien et al., 2019), so that where the process tends to be monotonous and the involvement of students in it is less related to learning by finding a concept (Samputri, 2020). This learning results in ignorance and a lack of understanding of students (Hasanah, U., Ertikanto, C., & Wahyudi, 2017). As in a case study stated by Sundari & Andriana (2018) that "Students have difficulty in summarizing the material given by the teacher with their language, students are less able to provide examples at the time of social studies learning, students are less able to understand and explain the learning material delivered by the teacher, students have not been able to classify the material presented by the teacher, low ability of students to conclude social studies learning material". Another case study put forward Dukomalamo et al. (2019) that learning that uses conventional lectures in the learning process but also interspersed with discussions, but in these discussions, it is less effective considering that not all students are active in

expressing opinions. Only some students have an active contribution, while others tend to be passive so that the learning has less effect on student learning outcomes (Kaharuddin, 2019). Therefore, teachers need to recognize opportunities that lead to improving student learning outcomes, one of the innovations is using teaching techniques in the classroom (Dharma et al., 2020).

Efforts of interesting teaching techniques in the learning process can be better, if with the use of learning models (Qomariyah, 2019). The learning model is one of the important roles that have components and is important to pay attention to so that a learning model can be implemented properly. These components include design and implementation (Hanum, 2013). Various innovative learning model designs can be used in learning, namely IBL (inquiry-based learning), PBL (problem-based learning), PjBL (project-based learning), Discovery learning (DL), and others (Liu et al., 2019; Park & Choi, 2015). Of the four models mentioned, the solutions in this study are PBL and Discovery learning. This is because both models of scientific approaches are based on a problem and emphasize for students to be active in learning (Ertikanto et al., 2018).

PBL (Problem based learning) is an active learning model that can support creativity in developing knowledge, and improving independent learning skills, teamwork, problem-solving skills, and critical thinking skills (Hsu et al., 2016). PBL has five stages in the implementation of PBL, namely: Presentation of problems, Organization of students, Group investigation, Development and display of results, and evaluation of investigation results (Ali & Setiani, 2018). Previous research has proven that the use of PBL has been implemented in mathematics learning materials (Diantari et al., 2015), geography learning (Salsabilla et al., 2014), and even in nursing (Park & Choi, 2015). The use of this model also in the learning outcomes of students can be a positive increase (Khatiban & Sangestani, 2014). Based on several previous studies, it is concluded that the use of PBL can be used as a reference for teachers in conducting good teaching.

In addition to this model, there is an alternative model that is different from the previous one, namely by using discovery learning, which emphasizes active thinking learning by finding, and investigating by itself so that processes and results will last a long time in memory (Tanjung & Syahputra, 2020). Discovery learning is a learning strategy that invites students to develop their mindset for the discovery of a concept or theory learned (Ertikanto et al., 2018). By finding a concept, students will think by analyzing and trying to solve the problem at hand by themselves. In this case, students feel interested and challenged about how to solve a problem (Junus, 2021; Yurniwati & Hanum, 2017). In the application of the discovery learning model, students are expected when participating in learning, students can be active and excited so that learning objectives can be achieved (Asriningsih et al., 2021). Based on the results of research by Ali & Setiani (2018) stated that there are six stages in the discovery learning model, namely stimulation, problem statement, data collection, data processing, verification, and generalization.

These two learning models are related, namely students are required to be active because the role of the teacher is only as an advisor and students acquire their knowledge independently (Sari et al., 2017). This is in line with Munawaroh & Masruri (2019) who states "in principle, learners formulate their questions and design, conduct and present their experiments" The use of problem-based learning models (PBL) and discovery learning is sought to answer problems related to learning outcomes. However, these two widely applied learning models also have comparisons. The comparison of these two models has been proven by Pribadi et al. (2020), the use of the PBL method is more effective against the cognitive, affective, and psychomotor learning outcomes of learners in grade 8 social studies lessons. Similarly, Gani et al. (2021), results of their research show that learning with the PBL model in social studies subjects is more effective than the discovery learning model. Contrary to the results of research conducted by Wardani et al. (2018) which has proven that the discovery learning model is superior, Siregar & Listiadi (2015) have proven that there is a significant difference in student learning outcomes between the use of the PBL model and the discovery learning method. Among the experimental and control classes, in other words, the experimental class is better than the control class. The results of previous research on the efficacy of applying the PBL model and the discovery learning model in social studies subjects showed that both models were effectively used on social studies learning outcomes. That raises doubts for teachers. In this study, evidence will be carried out through a research activity entitled "The influence of problem-based learning and discovery learning models on learning outcomes in economic subjects". So that the purpose of this study is to determine 1) the

influence of the Problem Based Learning model on learning outcomes when before and after being taught in economics subjects; 2) the influence of the Discovery learning model on learning outcomes when before and after being taught in economics subjects; 3) the influence of differences between Problem Based Learning and Discovery learning models on learning outcomes in Economics subjects.

METHODS

This research uses a quantitative approach to quasi-experimental design. The use of this experimental design aims to determine the effectiveness of differences in learning outcomes between the use of problem-based learning and discovery learning in Economics lessons. The research location is located at one of the high schools in Bojonegoro Regency. The population in this study is class XI social studies students in the even semester of the 2021-2022 school year. Where there are three classes XI namely Class of social 1, Class of Social 2, and class of Social 3. The selected sample is determined through purposive sampling techniques. This purposive sampling technique is based on several criteria considerations, namely the control and experimental groups came from one school, and with an average score of Midterm Assessment (PTS) in both classes that were relatively the same. Based on these considerations, class XI of Social 2 and class XI of Social 3 were selected as research samples. As for the two classes used in this study, the experimental group with class XI of Social 2, and the control group with class XI of Social 3. This study was conducted in 2022 from April to May. The design of this study can be seen in Table 1.

Table 1. *Research Design*

| Group | <i>Pre-test</i> | <i>Treatment</i> | <i>Post-test</i> |
|--------------|-----------------|------------------|------------------|
| Experimental | O ₁ | X ₁ | O ₃ |
| Control | O ₂ | X ₂ | O ₄ |

Source: (Sari et al., 2017)

Information:

- O₁: *Pre-test* experimental group
- O₂: *Pre-test* control group
- O₃: *Post-test* experimental group
- O₄: *Post-test* control group
- X₁: treatment with the use of PBL
- X₂: treatment with the use of discovery learning

First, before being used to test the learning results, research instruments must pass the validity test and reliability test stages. The instruments used measure student learning outcomes with the use of multiple-choice questions. Making multiple-choice questions is based on indicators of learning outcomes.

Table 2. N-Gain Score Result Category

| N-gain score (g) | Category | N-gain Score (Interpretation of effectivity in percentages) | Category |
|-------------------|-----------------|---|------------------|
| score < 0.3 | Less Increase | <40% | Ineffective |
| 0.3 ≤ score < 0.7 | Medium Increase | 40 – 50 % | Less Effective |
| score ≤ 0.7 | Height Increase | 56 – 75 % | Effective Enough |
| | | >76 % | Effective |

Source: (Hake, 1998)

When the data has been said to be valid and reliable, then the data is ready to be used for the next stage. Then the data collected in this study are Pre-test and Post-test results. Before the data is analyzed, the data will be tested for normality and homogeneity test with the help of IBM SPSS version

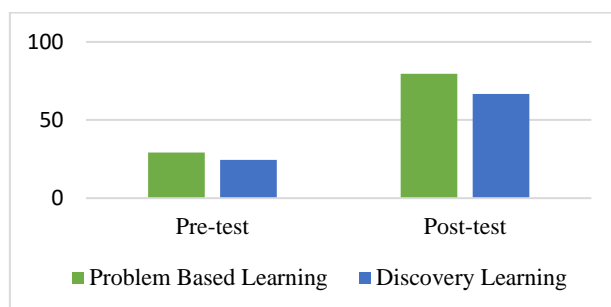
25 for windows. The existence of both tests is an assumption of whether normality and homogeneity are met or not. And the last stage is to analyze the data with the Independent Sample T-Test, where a test is carried out to find out the average difference in learning outcomes to the learning model. As for improving learning outcomes by measuring Pre-test and Post-test using N-gain. Previously the data were first analyzed with n-gain then the n-gain results categorized according to Hake (1998) are shown in Table 2.

RESULTS AND DISCUSSION

Result

These results will outline the research objectives listed in the introduction. Multiple-choice questions in this study require passing validity tests and reliability tests. There are some questions, namely 20 questions that have been tested for validity and reliability, the results of the test are declared validity and reliability tests are met, then the test questions can be used to assess student learning outcomes for both classes, namely experimentation and control through Pre-test and Post-test activities.

The types of results in the research that have been carried out produce data in the form of qualitative data obtained through the test scores of the two classes, and quantitative data, namely through an independent sample t-test analysis test to see the average difference in learning outcomes to the treatment carried out on the experimental group and control group by measuring the initial ability of students obtained through pre-test, and improved scores in learner learning outcomes. However, before conducting a sample t-test analysis test, the data must first pass prerequisite testing which includes normality tests, homogeneity tests, and finally independent sample t-test analysis tests. Each result is presented as Figure 1.



Source: Primary data processed, 2022

Figure 1. Average graph of pre-test and post-test results

Figure 1 showed that the experimental class before receiving the treatment with PBL had an average value of 29.23. However, after being treated with the use of PBL, the average post-test value of the experimental group increased by 79.62. In contrast to PBL, discovery learning before receiving treatment averaged a control group Pre-test score of 24.42. However, after receiving treatment with the use of Discovery learning, the average post-test value of the control group also increased by 66.67.

After the pre-test data of the experimental class and control class learning results were collected, it was further required to test the normality of the data with the use of the normality test with Kolmogorov-Smirnov and use SPSS version 25. Below are the hypotheses and the criteria for using the normality test.

H₀: normal distribution data.

H₁: The data is not normally distorted.

With the criteria used if the p-value \geq alpha value concludes H₀ is accepted, if otherwise then H₀ is rejected. The following normality test results for both classes can be seen in Table 3.

Based on Table 3, it is informed that the results of the Kolmogorov-Smirnov test obtained a result of 0.092 which means that the sig value (0.092) $>$ α (0.05) only in the Post-test experimental class, it is concluded that the data is normally distributed. While those with Sig values in the

experimental Pre-test, Pre-test control, and Post-test control classes < alpha values (0.05). Thus, concluding that the data is abnormally distributed data or H0 is rejected. Then the assumption of normality is not met, then a nonparametric statistical test will be carried out, namely by using the Wilcoxon Signed Rank test as in Table 4.

Table 3. *Normality Test Results*

| Group | Kolmogorov-Smirnov ^a | | | Alpa | Conclusion | |
|----------------------------|---|-------|------|-------|------------|----------|
| | Statistic | df | Sig. | | | |
| Students Learning Outcomes | <i>Post-test Experimental (PBL)</i> | 0.158 | 26 | 0.092 | 0.05 | Normal |
| | <i>Post-test Control (Discovery learning)</i> | 0.189 | 24 | 0.026 | 0.05 | Abnormal |

Source: Primary data processed, 2022

Table 4. *Wilcoxon Signed Rank Test Results*

| | Experimental | Control | Alpa |
|------------------------|--------------|---------|------|
| Z | -4.478b | -4.299b | |
| Asymp. Sig. (2-tailed) | .000 | .000 | .05 |

Source: Primary data processed, 2022

Based on Table 4 with the Wilcoxon Signed Rank test, both experimental and control groups obtained a result of 0.000, meaning the asymp value. Sig. < alpha value (α) (.000<0.05). It states that the hypothesis is accepted. So, there are significant differences in the use of models on student learning outcomes between the experimental group and the control group.

Table 5. *Average Difference Test Results between The Experimental Group and The Control Group*

| Model | Average Pre-test | Average Post-test | Increasing | N-gain (%) | Conclusion |
|-------------------------------|------------------|-------------------|------------|------------|------------------|
| <i>Problem based learning</i> | 29.23 | 79.62 | 50.39 | 71% | Less Effective |
| <i>Discovery learning</i> | 24.42 | 66.67 | 42.25 | 55% | Effective Enough |

Source: Primary data processed, 2022

Table 6. *Analysis Results Increased Value between The Experimental Group and The Control Group*

| Model | Average Pre-test | Average Post-test | Increasing | Gain Score | Conclusion |
|-------------------------------|------------------|-------------------|------------|------------|-----------------|
| <i>Problem based learning</i> | 29.23 | 79.62 | 50.39 | 0.71 | Height Increase |
| <i>Discovery learning</i> | 24.42 | 66.67 | 42.25 | 0.55 | Medium Increase |

Source: Primary data processed, 2022

Based on Tables 5 and 6, where it is known that the gain value of the experimental group with 0.71 means that the results of the Pre-test and Post-test values of the experimental group are in the criteria of high increase and are quite effective. Meanwhile, the control group gain value of 0.55 means that the results of the control group's Pre-test and Post-test values in the criteria of moderate and less effective improvement.

Discussion

The research that has been carried out in two classes with learning activities was carried out for 4 weeks. The meeting consisted of two face-to-face meetings in the room to be given learning model

treatment, once to conduct a pre-test and once to conduct a post-test in both experimental groups and control groups. Each lesson is 25 minutes. This research uses international trade materials. Learning activities are carried out offline while still complying with health protocols.

At the first meeting before giving treatment with a learning model to two groups, namely the experimental group and the control group, initially conducted a pre-test. This pre-test is used to see the same ability between the two groups. Furthermore, the post-test or final test is used to see the same final ability between the two groups and as data used for comparison to see the effectiveness of learning outcomes between the two groups. In the implementation of this study, the experimental group or class XI of Social 2 was given treatment with PBL, while the control group or class XI of Social 3 was given treatment with the use of discovery learning.

Problem-based learning model on learning outcomes in economics subjects

In Table 4, it is known that there is an influence of the PBL (problem-based learning) model on learning outcomes in the experimental group. The existence of this influence can be seen through the increase in learning outcomes in Figure 1, Table 5, and Table 6, which states that this model is quite effective on learning outcomes. The occurrence of influence accompanied by an increase in learning outcomes is due to students when given two treatments through the PBL model through the syntax contained in it. Which is the first time given syntax orienting students to problems in which students are less interested. However, when the second treatment is carried out, students have the enthusiasm to solve a problem and have the curiosity to solve the problem that exists in the real world. This is supported by previous research by Diantari et al. (2015) positing that "Students tend to be more active in the experiment class, by enforcing the emotional clock students know when it is time to discuss, the existence of a loose clock makes students feel entertained and return to learning. Problems that are close to everyday life become easier to understand. Being given complete freedom to solve problems causes students to be more creative and not feel afraid to express their opinions".

Then in the second syntax of organizing learners, when given the first treatment to determine and help coordinate tasks related to the given problem, the learners do not want to ask about what is not yet understood, but when the meeting of the two learners is very enthusiastic to ask about the material that is not yet understood. This is in line with Agusni et al. (2017) positing that "PBL supports students to argue which can improve the student's ability to express his opinion and communicate his thoughts to form a structured flow of reasoning".

Furthermore, the third syntax is to guide individual experiences, where at the first meeting the learners do not maximize to obtain a lot of information to solve the problem. However, at the second meeting, the learners maximized finding sources or information related to the problem of case study analysis. In line with previous research by Dharma et al. (2020) stated that "The Problem Based Learning (PBL) learning process also emphasizes strengthening concepts in real situations, higher-order thinking skills, and problem-solving skills".

The next syntax is that students must write about what has been obtained and then developed and presented in the work in the form of writing, in this syntax the student has been good enough to write down information from the discussion that has been carried out. This is relevant to the research of Agusni et al. (2017) who stated that "After obtaining evidence of solving problems in worksheets (LKS) so that students are accustomed to using scientific evidence for solving existing problems and can provide statements (claims), able to clarify and maintain claims with data and present scientific evidence, then it also means that students have fulfilled one of the problem-based learning objectives, namely mastery of knowledge content and learn problem-solving skills".

In the last syntax, the results of the work are analyzed and evaluated where students have been good at presenting problem-solving that has been done in small groups and large groups to correct each other or share opinions. This is relevant to the research Putri (2018) that problem-solving with discussion has the advantage that each person can play a lot of roles and can respect the opinions expressed by others so that they can practice social skills well. In addition, the PBL Model also has the stage of providing solutions and drawing conclusions that can encourage students' critical thinking skills. The evaluation process can influence critical thinking skills and learning outcomes (Dharma et al., 2020). So when students are directly involved in the learning process, it will have a positive impact

on students' memory of the material taught and can affect learning outcomes (Luo, 2019). In line with research by Djonomiarjo (2018) in his research revealed that when PBL is compared to traditional learning, student learning outcomes in economics subjects are much improved when using PBL.

Discovery learning model of learning outcomes in economics subjects

In Table 4, it is known that there is an influence of discovery learning on learning outcomes in the control group. The increase in learning outcomes is based on figure 1. The occurrence of influences and increases in learning outcomes is caused by the syntax contained in the discovery learning model. The first syntax is the provision of encouragement, in the first treatment students are given a problem only a few students pay attention to or want to know about the problem. However, in the treatment of the two students when given a problem, a different thing occurs, namely the emergence of student curiosity. This is supported by previous research by Dukomalamo et al. (2019) that the "learning model includes its ability to cultivate students' learning motivation and raise students' curiosity on theme learned and concept and ideas obtained from the learning outcome will be remembered for a longer time".

The second syntax is to identify problems, which is when students are maximal enough in identifying problems related to theories about the subject matter. This is relevant to a previous study by Junus (2021) which stated that: "The learning pattern of discovery learning method places students as subjects in active learning to build knowledge through investigations to solve problems based on certain stages. This is following the basic concepts and characteristics of discovery learning which are stated in learning and can be interpreted as a series of activities that emphasize the process of solving problems faced scientifically".

Furthermore, the third syntax is data collection to collect information to solve a problem. At the first meeting students have not motivated to collect information when the second meeting students are moved to collect the information. In line with previous research by Warsidayana et al. (2021) that students are trained to explore and process the information obtained to get solutions to the problems provided.

Then the fourth syntax is data processing where students have been quite optimal in analyzing data because the ability of these students is developed to think creatively and can master theories clearly and deeply. Syntax targeting learners to think critically and increase student cooperation in group work (Sandra, 2013). In line with the opinion of Melly et al. (2020) posit that "All observational interview reading information is classified and tabulated, even when necessary calculated in a certain way and interpreted at a certain level of belief".

The next syntax is proof where during the first treatment the learner is not careful enough to check the truth about the problem by looking for relevant sources. However, in the treatment of the two students, they have been more thorough in checking the truth related to the material. This is supported by previous research by Dehong et al. (2020) which stated that "Teachers (educators) guide students to carefully re-examine the results of the information obtained".

The last syntax is the drawing of conclusions, where at this stage the learners are good at drawing the conclusions that have been learned, this is due to the ability in their brains to think creatively and critically. This is relevant to previous research by Sumianingrum & Wibawanto (2017) that learners jointly draw conclusions that can be used as a principle together to make a general withdrawal and apply to all the same events or problems. The discovery learning model can help improve learning outcomes in economics subjects for students in class XI Senior High School/equivalent (Warsidayana et al., 2021). As for the research (Asriningsih et al., 2021; K. Hasanah & Nursalam, 2020; Laia, 2020) on social studies subjects they mentioned that positive learning outcomes can be improved with the use of discovery learning.

Although there is an influence on learning outcomes this model is stated to be less effective on learning outcomes based on table 6. This can be caused because learners have attention and curiosity but still do not maximize at the stage of observing the problem. In line with this previous research by Asriningsih et al. (2021) that some students have not dared to express their opinions. After one student expressed an opinion, the other student also expressed his opinion.

At the stage of wanting to find a problem and collecting data on material-related information, students do not maximize their potential. This is supported by previous research by Mash (2022) that in this case when students collect information and discuss with their groups, there are still many students who are crowded alone and not really so that the learning atmosphere in the classroom becomes rowdy and less conducive.

In addition, students take a long time to digest the material being studied, it is caused by the limited time when learning so that when answering existing questions, they do not maximize the theory or concept. Because there are still some students who do not understand the problems given by the teacher. So it takes up lesson time because teachers have to repeat and guide students in completing student worksheets (LKS) in their groups, and some students have not been able to complete student worksheets (LKS) independently (Anugrahana, 2020; Schlatter et al., 2020).

Differences between problem-based learning and discovery learning models on learning outcomes in economics subjects

Both models are learning models which require students to be active, critical and think creatively. Another similarity is that it helps to foster confidence in learners. In addition, in this learning model students are challenged in developing their abilities, allowing students to learn together with other friends, fostering relationships with others well, encouraging students to listen, respond, and respect the opinions of other friends and giving directions to students to make temporary assumptions regarding a problem presented. In essence, the creation of small groups for discussion has the thought and knowledge of learners that are different from each other. Therefore, from different thinking, it will create something that refers to solving the problem so that conclusions can be drawn from the results of the small group discussion. However, if these two learning models are compared, they must have differences.

Seen in Figure 1, Table 4, Table 5, and Table 6 show the difference between Pre-test and Post-test given to the experimental group and the control group. The experimental group used PBL, while the control group used discovery learning. The difference between these two models is that the first PBL emphasizes problem-solving. In this case, students have the curiosity to solve a problem when given a problem. In addition, students are enthusiastic in discussions with their groups to obtain information and analyze existing problems. This refers to Ertikanto et al. (2018) who posit that: "problem-based learning approaches are richer with representation, and can increase students' motivation in solving problems, generating conceptual knowledge well, and confidence in mastering concepts". In line with Prihatini et al. (2017), it research is a learning model that uses real-world problems as a context for students to learn critical thinking and problem-solving skills. In line with Nurochim & Prihatnani (2018), students will be more able to learn and understand if they know what the meaning of the material they are studying is, namely by students rediscovering and constructing the knowledge they are learning by themselves.

In contrast to discovery learning, which emphasizes basic theories or concepts in the material. In this case, students are less enthusiastic about the problems presented when given a stimulus. In addition, learners take quite a long time to discover theories related to the material. Learners do not have the readiness to collect and prove the information obtained related to the material, so learners get obstacles in receiving the material.

Although it has an impact on improving learning outcomes, students still have difficulties in the concept drafting process. Students have also been given stimulus and assistance to manage data, but students are still struggling so sometimes teachers have to provide these concepts which do not encourage students to learn (Nurochim & Prihatnani, 2018). It takes enough time to apply the discovery learning model and learners need to adjust to its application. In addition, it is difficult for teachers to control each student who has different characteristics, in a class that has a large number of learners (Prilliza et al., 2020). Many students for each class cause not all students to be able to apply the discovery learning model optimally, besides that, students are less able to adapt to researchers when learning.

These obstacles result in learners and result in the inadequacy of the syntax contained in this model. So, there is a need for further guidance so that students who have not achieved good grades are

not left behind and can follow the learning like other students. Referring to opinion Adinata et al.(2022) states that "learning with the discovery learning method tends to be carried out independently by students, but it is inseparable from teacher supervision. Where the teacher must continue to guide and supervise the learning process carried out by students so that later the results obtained can be better. When students are enthusiastic and serious about participating in learning, the results of obtaining student learning outcomes will be more satisfactory and show good results".

Previous studies have been carried out by comparing these two innovative models between PBL and discovery learning. This research Pribadi et al. (2020) supports research that states that the PBL model and discovery learning, when compared to the PBL model in improving student learning outcomes, especially in social science subjects. Where the research was used was class VIII in the odd semester at Junior High School 1 Cikijing. As for classes with the use of PBL, the average results of cognitive, psychomotor, and affective values are better and higher when compared to classes with the use of discovery learning. Another study, Buana & Anugraheni (2020) also stated that the use of PBL is higher when compared to classes with the use of discovery learning in research with social science subjects class IV. In line with other research by Gani et al. (2021) stated that before the use of the model was applied, many students were not complete in the subject of social science class IV but when it was applied many students completed it.

CONCLUSION

Based on the description above, the results of this study concluded that there is an influence of the PBL model on student learning outcomes in economics subjects. Meanwhile, the discovery learning model affects student learning outcomes in economics subjects. As for the experimental group with the use of PBL and the control group with the use of discovery learning, there were significant differences. The average post-test results that have been carried out on the experimental group with PBL treatment are 79.62 higher than the control group with the use of discovery learning, which is 66.67 in economics lessons for class XI social studies students at one of the high schools in Bojonegoro regency. Understanding this research also has limitations, where this research is carried out only on certain economic subjects and materials. In this case, it is recommended for further research in other fields of knowledge and other materials with variations in learning models that are appropriate aspects of learning outcomes. It is hoped that using this learning model creates a good, effective, and active learning process and can be used to improve the quality of teacher learning in the classroom.

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