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Blended Problem Based Learning Through SIMPEL-12: Strategies to Improve Economic Critical Thinking Ability

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Abstract

21st Century Learning encourages students to have critical thinking skills, one of which is economics. The problem is, the study of data in the field shows that students lack critical thinking skills in analyzing economic problems. Teachers need to innovate in the application of learning models and media. This study aims to analyze the effectiveness of blended problem-based learning through SIMPEL-12 to improve critical thinking skills. This study uses a quantitative approach with a quasi-experimental design. The results of the hypothesis test showed a significance value of 0.000 <0.05, t hitung (7.268) > t table (1.99444), and the experimental class n-gain test was 0.5258 which was higher than the control class was 0.2732. The conclusion of this research is the blended problem-based learning model through effective SIMPEL-12 to improve the ability to think critically in economics class XI IPS in SMA Negeri 12 Semarang.

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INTRODUCTION

Humans are currently living in the 21st century, an era that can also be called the era of knowledge, information technology, globalization, economy knowledge-based, and the era of the industrial revolution 4.0 (Redhana, 2019). In this era, changes occur very quickly and are difficult to predict in all aspects of human life. Human resources need to be equipped with various competencies to face the 21st century. Educational institutions have a big responsibility to prepare a generation that is ready to face the 21st century. A generation that can think critically, communicate, collaborate and be creative (Partnership for 21st Century Learning: 2016). Marfuah, et al. emphasize that one of the 21st-century competencies that are fundamental and effective in being used in various life perspectives is critical thinking (Marfuah, 2017). Emphasizes that one of the 21st-century competencies that are fundamental and effectively used in various perspectives of life is critical thinking. Through critical thinking skills, students can make decisions reflectively and solve problems by analyzing, evaluating thoughts, and drawing selected conclusions (Stobaugh, 2013). 21st-century learning encourages students to have critical thinking skills, one of which is through economics subjects.

The facts that occurred today, the study of data in the field show that students do not master critical thinking skills. Based on the survey of the Program for International Student Assessment (PISA) revealed that the results of the scores above show the ability and application of students in Indonesia in solving problems and reasoning is still not optimal, students should be able to implement their knowledge in conditions that have never been experienced though, the ability to This is what is known as critical thinking ability (Lestari & Annizar, 2020). In line with the study of the data above, preliminary research conducted with economics teachers at SMA Negeri 12 Semarang explains that students do not yet fully have the ability to think critically. If examined based on critical thinking indicators according to Jacob & Sam (2008) namely formulating problems, providing arguments, drawing conclusions clearly and logically, and solving problems, in economic learning activities that occur in class it is felt that it does not empower students' ability to think critically. In learning activities, students do not dare to give arguments when the teacher invites students to ask questions. This makes students not fully develop ideas, arguments, and alternative problem-solving optimally. In addition, the ability to think critically can also be seen from the acquisition of learning outcomes in economic subjects that are less than optimal.

Innovation in learning becomes an alternative solution that can be designed by teachers to improve students' critical thinking skills, including innovation in the learning model used by teachers. Yuniawati et al. (2019) revealed that one aspect of learning activities is by making creative innovations in learning activities to encourage students to be able to face the challenges that exist in the current era. The recommended learning models in implementing the 2013 curriculum include Problem Based Learning, Project Based Learning, and Discovery Learning (Mas'ud, 2013; Agustina, 2018). Several research results show that problem based learning can improve students' critical thinking skills. Kardoyo, et al. (2020) show that the application of problem based learning can improve students' critical and creative thinking skills. (Restuti, Rusdarti, & Sunarso, 2021)) revealing problem-based learning will increase students' critical thinking ability and conceptual understanding. Hestiningtyas et al. (2021); Basith, A. & Amin (2017) also showed that the problembased learning model can be used to improve the critical thinking skills of high school students.

The next innovation teachers make is using information technology in the learning process. Teaching and learning activities that are integrated with information and communication technology can increase the efficiency and effectiveness of learning (Kemendikbud, 2016). Learning media based on information and communication technology is a must that is applied by teachers (Adros & Oktarina, 2019). The use of information technology in the learning process has led to a blended learning approach (Nurkhin et al., 2020). The implementation of blended learning by combining face-to-face learning methods with technology can be used as an innovation in

learning to improve the quality of learning. Several research results revealed that blended learning can combine variations of face-to-face learning with online learning (Niam Wahzudik & Wahzudik, 2019; Nurkhin et al., 2020). Hasanah and Malik (2020) explain that the implementation of blended learning is effective for improving critical thinking skills. Putra & Fitrayati (2021) added that blended learning is effective for improving students' critical thinking skills in economic subjects.

Learning innovation by combining problem based learning and blended learning will further improve students' critical thinking skills in economics subjects. This statement is corroborated by research results Qalbi & Saparahayuningsih (2021) which show that the blended problem based learning model can improve students' critical thinking skills. Nurkhin et al. (2020) also show that students' critical and creative thinking skills increase by using the blended problem-based learning model.. Lukitasari et al. (2019) explained that the application of blended problem-based learning was able to train students to improve their critical thinking skills in answering the questions given. Wahyudi et al. (2019) explain that problem-based mixed learning is effective, valid, and practical to improve critical thinking skills.

Mixed learning has now become a demand that must be done by teachers. Technological developments have occurred also facilitated blended learning a lot. Information and Communication Technology that supports this learning process is commonly called a Learning Management System (LMS). An LMS is a software application that supports online activities, electronic learning (e-learning programs), and training. Dias, S. B., & Diniz (2014) revealed that LMS in blended learning can produce interactive learning activities

SMA N 12 Semarang is one of the educational institutions in Semarang City that has developed a Learning Management System (LMS) independently to support web-based learning activities. The Learning Management System (LMS) developed was name SIMPEL-12 wich stands for E-learning Learning Management Information System at SMA N 12 Semarang. The digital platfrom has a comprehensive menu including Home; Announcement; Message Box; Presence; Teaching Schedule; Theory; Student Filters; Task; Live Meets; and Extracurricular used by students and teachers in the learning process.

The use of SIMPEL-12 can create independent learning that is interactive, flexible, and fun. SIMPEL-12 is also used to facilitate the evaluation of student learning outcomes, namely in the form of daily assignments, midterm exams, final semester exams, and school exams.

The purpose of this study was to analyze the effectiveness of using the blended problem-based learning model through SIMPEL-12 on the ability to think critically in economics in class XI IPS students at SMA Negeri 12 Semarang.

RESEARCH METHODS

This research refers to a quantitative approach with a quasi-experimental research design. The population in this study were all students of class XI IPS at SMA N 12 Semarang for the academic year 2021/2022 which consisted of 5 classes or 180 students. The samples of this study were 36 students of class XI IPS 4 as the experimental class and students of class XI IPS 2 which amounted to 36 students as the control class.

The research procedure is divided into three stages, namely the preparation stage, the implementation stage, and the reporting stage. Data collection techniques using test and documentation techniques. The data collection instrument used was a test. The test was used to measure students' critical thinking skills before and after learning with the blended problem based learning model through SIMPEL-12. The test is given in the form of multiple choice. The research instrument trials consisted of validity testing using *Bivariate Correlation*, reliability testing using *Cronbach Alpha*, item difficulty level testing, and discriminating power testing. While the data analysis technique was carried out with the help of the IBM SPSS Statistic 26 programs, namely the normality test was carried out by the *Kolmogorov Smirnov* test, the homogeneity test was carried out by the *Levene's test*, the hypothesis test was carried out by the independent sample t test and the n-gain test to determine the increase in the average between pre test scores and post test scores for the control class and the experimental class.

RESULTS AND DISCUSSION

Blended Problem Based Learning through SIMPEL-12 in Economics Subject at SMA Negeri 12 Semarang

Blended problem-based learning is a combination of a blended learning approach with a problem-based learning model (Qalbi & Saparahayuningsih, 2021). The implementation of blended problem-based learning used is by utilizing learning information technology in the form of the Learning Management Information System at SMA N 12 Semarang (SIMPEL-12). The blended problem-based learning model through SIMPEL-12 was implemented in the experimental class with face-to-face learning and online learning schemes.

Treatment begins with preparing learning videos, learning modules, and SIMPEL-12 conditioning. Furthermore, pre-introduction learning is carried out, which is carried out online. The teacher first greeted and greeted students through the WhatsApp group and continued by giving directions to students to work on pre-test questions. The pre-test questions aim to measure students' prior knowledge of the material to be studied together. After the pre-test process is complete, students are asked to study international trade materials that the teacher has provided at SIMPEL-12, namely in the form of learning videos, learning modules, and discussions before face-to-face learning in class takes place.

Figure 1. Online learning through SIMPEL-12

The second treatment in the experimental class was carried out through face-to-face learning in class. Face-to-face learning consists of preliminary activities, core activities, and closing activities. In the preliminary activity, the teacher conveys the apperception of the material that has been previously studied through SIMPEL-12, then relates it to the material to be conveyed. Learning objectives, indicators of competency achievement, and the benefits of mastering the material as well as designed learning scenarios are explained before the teacher continues with problem based learning by dividing study groups. In the core activity, students responded to some of the teacher's questions about the driving factors, inhibiting factors, and policies in international trade. Furthermore, the teacher presents phenomena in international trade in the form of video shows entitled "Cuan RI Bans Import of Raw Goods", "Russia-Ukrainian War Threatens Indonesia's Economy", "International Trade Efficiency with Local Currency", and "Indonesia Bans Coal Exports, World Pitch black?" which have been presented by the teacher in SIMPEL-12. Each study group conducts group discussions to conduct a critical analysis of the problems that occur in the learning video. In closing, the teacher presented the lesson plan at the next meeting and was motivated to continue studying the material available in SIMPEL-12, each group also prepared a presentation of the results of the group discussion.

Figure 2. Discussion by each study group in the experimental class

The next treatment in the experimental class was carried out in three stages, namely preliminary, core, and closing activities. The core activities in learning are carried out by presenting and discussing the results of each group's critical analysis in front of other groups by giving other groups the opportunity to respond and the teacher providing feedback. The discussion activity ended by responding to the learning reflection and the teacher gave conclusions, benefits, and learning activities that have been carried out. The results of each group's discussion are uploaded to SIMPEL-

12 so that they can be used as learning materials for other groups, and they are welcome to continue online discussions through SIMPEL-12. Before the closing activities on learning, students were given post-test questions to determine the students' abilities in the experimental class after being given treatment. The activity ended with greetings and prayers.

Figure 3. Presentation of the results of the discussion in the Experimental Class

Descriptive Statistical Analysis Results

Table 1. Description of Pre-test Results for Control and Experiment Class

Component	Control	Experiment
Total Students	36	36
Average	54,2222	57,5833
The Highest Score	36	36
Lowest Score	72	76

Source: Research data processed, 2022

Table 2. Description of Post-test Result for Control and Experiment Class

Component	Control	Experiment
Total Students	36	36
Average	67,2778	80
The highest score	36	72
Lowest score	76	96

Source: Research data processed, 2022

Pre-test Data Normality Test

The normality test was conducted to determine whether the pretest and posttest data of the control class and the experimental class obtained were normally distributed or not. Normality testing was carried out using the Kolmogorov-Smirnov test using SPSS 26.

Table 3. Normality Test Results of Pre-test data for control class and experimental class students

Data	*Kolmogorov -Smirnov*	Sig	Data Distribution
Control	0,149	0,073	Normal
Experiment	0,051	0,051	Normal

Source: Research data processed, 2022

Table 3 shows that the results of the pre-test in both classes came from a normally distributed population.

Pre-test Data Homogeneity Test

The homogeneity test was conducted to determine whether the two classes had homogeneous variance or not in the pre-test values of the control class and the experimental class. The homogeneity test was carried out by using Levene's test using SPSS 26.

Table 4. Results of Homogeneity of Pre-Test Data for control class and experimental class students

Levene's statistic	Sig	Conclusion
1,882	0,174	Homogeneous

Source: Research data processed, 2022

Table 4 shows that the significance value of the homogeneity test of variance from the pre-test data is 0.174, which is greater than the level of the sig, which is 0.05. Based on this, it can be concluded that the pre-test scores in the control class and experimental class that has been tested are homogeneous.

Post Test Data Normality Test

Table 5. Normality Test Results of Post Test Data for control class and experimental class students

Data	*Kolmogorov -Smirnov*	Sig	Data Distribution
Control	0,252	0,078	Normal
Experiment	0,222	0,200	Normal

Source: Research data processed, 2022

Table 5 shows that the post-test results in both classes are normally distributed.

Post-Test Data Homogeneity Test

Table 6. Homogeneity Test Results of Post Test Data for control class and experimental class students

Statistic	Sig	Conclusion
1,113	0,295	Homogeneous

Source: Research data processed, 2022

Table 6 shows that the significance value of the homogeneity test of variance from the post-test data is 0.295, which is greater than the level of the sig, which is 0.05. Based on this method, it can be concluded that the pre-test scores in the control class and experimental class that has been tested are homogeneous.

Hypothesis Test

The hypothesis test used in this study is the independent samples t-test with the decision-making rules used H_0 is accepted if t count < t_{table} and H_0 is rejected if $t_{arithmetic} > t_{table}$ or H_0 is accepted if sig value > 0.05 and H_0 is rejected if sig value < 0.05.

The proposed hypothesis is as follows:

H_0: Blended problem based learning through SIMPEL-12 is not effective in improving the ability to think critivally in economics.

H_1: Blended problem based learning through SIMPEL-12 effective improves rhe ability to think critically in economics.

The hypothesis test performed shows that the t_{count} obtained is 7.268 and t_{table} = 1.99444 (df=70) then $t_{count} > t_{table}$ and when viewed from the significance value obtained 0.000 <0.05, which means H_0 is rejected and H_1 is accepted.

Table 7. Hypothesis Testing

Class	Average	Dk	T_{count}	t_{table}
Control	67,27	70	7,268	1,994
Experiment	80			

Source: Research data processed, 2022

Table 7 shows the average final test results for the control class of 67.27 and the experimental class of 80 with Dk = 70. This shows that there are differences in critical thinking skills in international trade material between the control class using problem based learning models through clipping media and the experimental class using the blended problem-based learning model through SIMPEL-12. So it can be concluded that blended problem-based learning is effective to improve the economic critical thinking skills of class XI IPS students at SMA Negeri 12 Semarang.

N-gain Test

Table 8. N-gain test results for control class and experimental class

Class	N-gain Score	Criteria
Experiment	0,5258	Currently
Control	0,2732	Low

Source: Research data processed, 2022

Table 8 shows that the average pre-test to post-test scores from the experimental class are higher than the control class. The n-gain value obtained in the control class of 0.2732 is included in the low criteria, while the acquisition of the n-gain value in the experimental class of 0.5258 is included in the medium criteria. The average increase in pre-test and post-test scores on international trade materials in both classes is presented in the following graphic diagram.

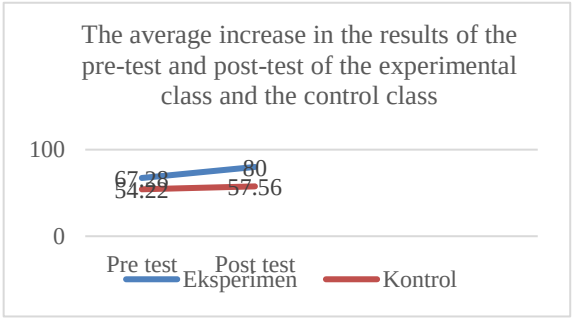

Figure 4. Diagram of the average increase in pre-test and post-test results

The effectiveness of the applied model of blended problem-based learning through SIMPEL-12 affects increasing students' thinking skills, especially in economics. Based on the findings in the field, the experimental class or class XI IPS 4 which applies the blended problem-based learning model through SIMPEL-12 provides a learning atmosphere that supports students to improve critical thinking skills. The implementation of this learning model combines face-to-face and face-to-face learning by utilizing information technology. Before face-to-face learning is carried out, the teacher provides face-to-face learning treatment in

the form of learning carried out by utilizing technology, namely through SIMPEL-12.

Learning through SIMPEL-12 makes it easier for students to access various educational services that have been provided by teachers independently, wherever, and whenever flexibly. This allows students to learn the material it is delivered by the teacher in the classroom. While face-to-face learning in the teacher's classroom presents problem-based learning and this will arouse students' curiosity to solve problems using the stages of critical thinking skills. Students' critical and creative thinking skills can be improved through the use of the blended problem-based learning model (Nurkhin et al., 2020; Qalbi & Saparahayuningsih, 2021). Lukitasari et al. (2019) also explained that students' critical thinking skills in answering questions increased through the blended problem-based learning model. Wahyudi, et al. Wahyudi et al. (2019) stated that problem based mixed learning (PB2L) conducted for elementary school teachers was effective, valid, and practical to improve critical thinking skills. Marnita et al. (2020) added that blended problem based learning can improve the critical thinking skills of thermodynamics course students.

Constructivism theory explains that students are expected to organize experiences in learning to challenge students' mindsets so that new understandings will be formed through observation, data collection, formulating and testing hypotheses, and then collaborating with others (Schunk, 2012). The constructivism theory used is also based on Vygotsky's opinion about Vygotsky's sociocultural theory, that the social environment is a facilitator to be able to construct new ideas that can improve student development (Schunk, 2012).

The constructivism theory described above is in line with this research. Through blended problem based learning that combines face-to-face learning and online learning, it will support constructivism theory where students will have knowledge and understanding by being more active in seeking information on their own with the help of technology. In addition, students will be able to set their own goals and be able to evaluate their progress so that the nature of critical thinking will be more honed. A social environment is a place for students to seek invaluable experiences that are also able to encourage students to learn. Through blended problem based learning using SIMPEL-12, it will encourage students to learn together with their social environment so that they can construct critical thinking skills in solving existing problems. If students' critical thinking skills increase, it indicates that students already have skills in understanding problems, fluency, flexibility, and problem solving novelty (Siswanto in Kardoyo et al., 2020).

Several previous studies are also in line with the results of this study. Nurkhin (et al., 2020) analyzed the effectiveness of blended problem based learning on accounting students so that students' critical and creative thinking skills and learning outcomes increased. The implementation of the blended problem based learning model is carried out with the help of Google Classroom and combined with face-to-face lectures, the results show that students are able to get better grades than before being given this learning method. (Hikmawati, 2020) applies problem-based mixed learning using the google classroom application in order to have an impact on increasing students' information literacy and critical thinking. The results showed that there was a significant difference between blended-PBL when compared to conventional-PBL in biology subjects. (Junipah et al. (2019) also conducted development research by applying problem based learning through blended learning whose implementation was assisted by Google Classroom to be able to analyze the effectiveness and practicality of the learning model. The results show the development of learning models that are carried out effectively to provide higher learning outcomes. Lukitasari et al. (2019)) research cell biology courses that apply blended problem based learning on its effect on critical thinking. The results showed that students' ability to answer questions increased after being given blended problem based learning. There is also research by Marnita et al. (2020) and Habibah et al. (2022) that reveals that by applying the problem-based learning model based on blended learning, the results are satisfactory.

The study of the results of previous research with the results of this study became the basis for concluding that the use of the blended problem based learning model through SIMPEL-12 was effective in improving the critical thinking skills of

class XI IPS students at SMA Negeri 12 Semarang in economics subjects material international trade as evidenced by the existence of improvement in student learning outcomes.

CONCLUSION

Based on the results of the study, it can be concluded that blended problem-based learning through SIMPEL-12 is effective for improving the economic critical thinking skills of XI IPS class students. This is evidenced by the hypothesis test obtained, namely t_{count} 7.268 > t_{table} 1.99444 and the sig value obtained is 0.000 <0.05, which means H_0 is rejected and H_1 is accepted. In addition, the increase in students' critical thinking skills is also evidenced by the results of the n-gain test in the experimental class of 0.5258, which is higher than the control class of 0.2732.

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