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THE EFFECTIVENESS OF THE PBL MODEL ASSISTED BY ANIMATED VIDEOS IN ENHANCING STUDENTS' CRITICAL THINKING SKILLS.

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Abstract

Seeing the learning conditions in class XI BDP SMK Negeri 1 Slawi has not implemented the PBL model optimally and does not involve student activities. When learning takes place, it is still centered on the teacher and students tend to be passive. This has an impact on the lack of development of student's critical thinking skills during learning. The purpose of this study was to test and analyze the effectiveness of the application of the problem-based learning model assisted by animated videos in improving students' critical thinking skills. The research method used was a quasi-experiment with a nonequivalent control group design. The population of this study was students of class XI BDP SMK Negeri 1 Slawi. The sample of this study was students of class XI BDP 2 as the control class and class XI BDP 4 as the experimental class using purposive sampling techniques. Data collection techniques were tests, observations, interviews, and questionnaires. Data

analysis techniques used independent samples t-test and n-gain tests with SPSS Statistic 25 software. The results of the independent samples test showed a sig. (2-tailed) value of 0.042 <0.05 meaning Ha was accepted. So, there is a difference in the average results between the experimental class and the control class. Based on the research results, it can be concluded that the application of the problem-based learning model assisted by animated videos is effective in improving students' critical thinking skills.

Keywords

Critical Thinking Skills, Problem Based Learning Model, Animation Video

Introduction

In the era of 4.0, education is very important to support students in having learning and innovation skills, skills in using and utilizing information technology, being able to work and survive with mastery of one of the life skills, namely high-level thinking skills (Wijaya et al., 2016). One part of high-level thinking skills is critical thinking skills, where this ability is oriented towards solving problems and is believed to be able to prepare students to face the challenges of work and everyday life (Aida Isela Ramos, 2013). This is supported by Sumarno & Gimin, (2019) stating that to compete in the era of Industry 4.0, human resources must have abilities related to critical thinking. Therefore, this critical thinking ability needs to be developed.

The development of critical thinking skills is very necessary during the learning process because critical thinking helps students analyze their thoughts to determine choices and draw conclusions (Sulistiani & Masrukan, 2017). Critical thinking skills must and are important for students to have so that they are able to solve problems found in everyday life (Asriningtyas et al., 2018). Some characteristics can indicate that students have critical thinking skills, namely, students are more skilled at giving simple reviews,

being able to build basic skills, giving conclusions, giving explanations, and in academic activities at school being able to interact with others (Novianti, 2020).

The results of research on the learning process that was studied by Suaeb, (2020) stated that grade XI students still have a low level of critical thinking skills in creative product and entrepreneurship subjects. This is because the student learning process tends to be by memorizing and writing on the board, the ability to ask questions and express opinions is still very low. Meanwhile, in learning creative products and entrepreneurship, they are required to be able to think critically. This statement was emphasized by Rahmi & Khasanah, (2019) who stated that the learning model that is currently widely applied in teaching and learning activities is still centered on the teacher or with the term conventional learning. This phenomenon proves that some students do not yet have and use critical thinking skills during classroom learning (Maqbullah et al., 2018).

Based on the description of the research results regarding the creative product and entrepreneurship learning process that has been studied previously, it is necessary to apply an appropriate and innovative learning model to meet the needs and help students master the material being studied (Hasanah et al., 2021) and develop critical thinking skills because by thinking critically students will use their thinking potential to the maximum to solve a problem faced in everyday life (Sulistyani & Harnanik, 2014). One of them is replacing teaching and learning activities with conventional methods and implementing problem-based learning (Devi & Bayu, 2020).

According to Yuniarti & Hadi, (2015) is an alternative learning model that can develop students' thinking skills in terms of reasoning, communication, and connections in problem-solving. The problem-based learning model is a learning model that introduces new concepts to students to provide students with the opportunity to be actively involved in teaching and learning

activities. Where students actively think to find solutions to problems related to their social lives. The problem-based learning model also helps students when learning independently by providing experiences to improve their way of thinking and teaching the ability to find solutions as a solution to a problem (Sianturi et al., 2018).

According to Imas & Berlin, (2015), there are several objectives of the problem-based learning model, including helping students develop thinking skills and problem-solving skills, developing critical thinking and developing creative skills, developing student learning motivation, and providing a new atmosphere for students in transferring knowledge.

The problem-based learning model has advantages and disadvantages. According to Ruspiandi, (2016), the advantages of the problem-based learning model are that during the learning process, the teacher is only a facilitator, and learning is centered on students, in other words, when learning is not dominated by the delivery of material by the teacher and guiding teaching and learning activities so that students can learn actively, encourage creativity and student learning outcomes experience improvement, and make learning activities in the classroom seem more meaningful because the problem-based learning model emphasizes cognitive, affective, and psychomotor aspects. In terms of its advantages, the problem-based learning model is designed to improve thinking skills, solve problems, and learn to play the role of adults through their participation when solving problems. Therefore, students to play an active role in learning activities and they have the opportunity to use and develop their critical thinking skills to solve problems presented during learning (Fristadi & Bharata, 2015). This is supported by previous research conducted by Farisi et al., (2017) and Sianturi et al., (2018)

showing results that there is a significant influence between the application of the problem-based learning model and students' critical thinking skills. Another study conducted by Dianawati et al., (2017) stated that the problem-based learning model makes students more active in exploring their knowledge as a basis for solving problems, thus increasing students' critical thinking skills.

In addition to its advantages, the problem-based learning model also has disadvantages. According to Shoimin, (2016), the disadvantages of the problem-based learning model include the fact that it takes a long time to implement, the problem-based learning model cannot be applied to each learning process, and if each class has students with the same characteristics, the application of the problem-based learning model is less suitable because it can cause obstacles in presenting assignments. This opinion was emphasized by Ruspiandi, (2016) who stated that the disadvantages of the problem-based learning model include planning for learning activities which is quite difficult because teachers dominate learning.

To overcome these shortcomings and to ensure that the application of the problem-based learning model runs effectively, supporting media in the form of learning media is needed. The use of media in learning activities is one way to create a more meaningful classroom atmosphere and quality learning, making it easier for teachers to deliver material during learning so that what is being studied is easier for students to understand and comprehend (Sari et al., 2021). In addition, the use of learning media can foster students' enthusiasm for learning. This allows students to improve their understanding of the material presented by the teacher. One of the learning media that can be applied during learning is animated videos (Rosanaya & Fitrayati, 2021).

Animated videos are videos that display movement in the form of cartoons so that they focus students' attention during learning (Yuliani & Armani, 2019). According to Ayuningsih, (2017), animated videos are displays that contain a combination of media in the form of writing, tabulation, or sound on movement activities. Widiyasanti & Ayriza, (2018) mention the benefits of animated videos in learning, including providing unexpected experiences and giving impressions during the learning process to students, animated videos can monitor learning hours so that teachers don't need to worry if they run out of time.

The use of animated videos can help improve the effectiveness of the learning process, such as increasing student attraction and motivation to participate in teaching and learning activities (Putra et al., 2020) because animated videos combine audio and visuals simultaneously and students will use two senses at once to understand the material given by the teacher (Novelia & Hazizah, 2020). Through animated videos, the information that will be conveyed by the teacher during learning can be conveyed easily and can help students describe the information they have received, so animated videos are very appropriate as a choice as a learning medium (Rosanaya & Fitrayati, 2021).

SMK Negeri 1 Slawi is one of the vocational schools that has implemented the 2013 curriculum and requires its students to take the creative product and entrepreneurship subjects. Malau, (2020) argues that learning creative products and entrepreneurship is one of the important subjects because it integrates all levels of education in Indonesia and this subject requires students to think critically to implement the material in everyday life. At SMK Negeri 1 Slawi, the subject of creative products and entrepreneurship is taken in grades XI and XII for all majors. What

is unique about the subject of creative products and entrepreneurship is that there are differences in the learning system applied in each class. One of them is in class XI Online Business and Marketing. The learning system in class XI BDP is that the teacher provides theory first and then does a project.

Initial observations made at SMK Negeri 1 Slawi by researchers, especially in class XI BDP 4, when learning the subject of creative products and entrepreneurship, it was found that learning in the classroom had implemented a problem-based learning model, but its application was not by the syntax or steps of the problem-based learning model that meets standards. When the learning activity began, students showed passive conditions and there were no learning activities that involved student contributions. This makes students not accustomed to using their critical thinking skills to solve problems given by teachers in a lesson. The lack of teacher innovation in the application of learning models in the classroom and the lack of student involvement indicate low critical thinking skills which also have an impact on low learning outcomes for creative entrepreneurship products.

The percentage of daily tests for creative products and entrepreneurship subjects in class XI BDP 4 SMK Negeri 1 Slawi has not met the Minimum Completion Criteria (KKM) standard at the school of 75. From the two daily test scores, the percentage of students who have not reached the KKM score is still relatively high. Some factors influence the low learning outcomes in class XI Online Business and Marketing, namely internal and external factors. Internal factors are factors originating from students themselves as students and external factors are school environmental factors such as the learning process (Oktaviani et al., 2020). Teaching and learning activities that are carried out

optimally, such as teachers managing classroom conditions during learning well, will affect the learning outcomes that will be obtained to achieve maximum results (Saggaf et al., 2017).

Based on the results of interviews conducted by researchers with one of the teachers teaching creative products and entrepreneurship subjects, namely Mr. M. Maulani Subhi, S.Pd, during learning activities, they have tried to apply the problem-based learning model in the class they teach, but there are still obstacles and it has not been implemented sustainably. The less-than-optimal implementation of the problem-based learning model is also influenced by the condition of the students, where students seem to prefer to just listen rather than discuss during learning activities. This is evidenced by the fact that no students dare to express their arguments when the teacher asks questions. Therefore, learning applies the problem-based learning model but its implementation is still conventional or teacher-centered learning. In this case, the teacher delivers the material while students only listen and pay attention to the explanation of the material. Furthermore, at the end of the learning process, students are given assignments. During the learning process, other learning media have not been used other than the use of visual media in the form of PowerPoint slides.

With the current conditions of the COVID-19 pandemic, the entire learning system in schools has been changed to distance learning, or what is known as online learning. Of course, it causes many obstacles during the implementation of teaching and learning activities. Teachers and students must be able to adapt from face-to-face learning to online-based learning. This is certainly an obstacle for all educational institutions, especially at SMK Negeri 1 Slawi in learning in the subjects of creative products and entrepreneurship. The main obstacle is the problem of learning hours. For each subject, only 30 minutes are given. The subjects of creative products and entrepreneurship have quite a lot of teaching hours because the system of this subject is in the form

of theory and practice. In addition, for each basic competency, there is also quite a lot of material and it is less effective if the time given is only 30 minutes.

The second obstacle is that students are very difficult to work together during learning because many students are reluctant to take online classes. They are more enthusiastic when learning is only given material and assignments through the class WhatsApp Group. In addition, if the teacher asks students questions, they prefer to remain silent rather than give their opinions. Such a situation certainly has an impact on the lack of development of their critical thinking skills which will also affect the learning outcomes of students who have not reached the Minimum Completion Criteria (KKM) standard.

For this reason, further testing is needed regarding the effectiveness of the application of the problem-based learning model assisted by animated videos in improving students' critical thinking skills in the creative product and entrepreneurship subjects in class XI BDP SMK Negeri 1 Slawi. Testing the effectiveness of this learning model is applied to the KD 3.8 material calculating the cost of production. Where the main topic of the material calculating the cost of production has the characteristics of analysis and application, the material calculating the cost of production does not only study the theory, the most important thing is that students can develop their critical thinking skills in completing case studies given by the teacher, because the orientation of this material is in the form of calculations that require deeper analysis.

Based on the background above, the purpose of this study is to test and analyze the effectiveness of the problem-based learning model assisted by animated videos in improving the critical thinking skills of class XI BDP students of SMK Negeri 1 Slawi.

Method

This research method uses a quasi-experiment. According to Sugiyono, (2013), a quasi-experiment is a type of research that can be applied by researchers to find out and find out whether or not a given treatment can affect the variables studied on other variables with controlled conditions. The quasi-experimental research design in this study uses a nonequivalent control group design (Creswell, 2014).

Group	Pretest	Treat	Posttest
Group A	T1	X	T2
Group B	T3	-	T4

Figure 1. Nonequivalent Control Group Model Source: Adapted from Creswell, 2014

Description:
Group A: Experimental Class
Group B: Control Class
X: Implementation of PBL model assisted by animated video
T1: Pretest class XI BDP 4
T2: Posttest class XI BDP 4
T3: Pretest class XI BDP 2
T4: Posttest class XI BDP 2

The location of research was carried out at SMK Negeri 1 Slawi located at Jalan KH. Agus Salim No. 1 Procot, Tegal Regency. The time of the research was conducted on March 16, 2022 - finished. The population of this study was class XI students majoring in Online Business and Marketing (BDP) in the 2021/2022 academic year consisting of four classes, namely class XI BDP 1, XI BDP 2, XI BDP 3, and XI BDP 4 with a total of 143 students. The sample of this study was class XI BDP 2 as a control class by implementing the usual PBL model without media assistance with a total of 36 students and class XI BDP 4 as an

experimental class by implementing the PBL model assisted by animated videos with a total of 35 students where in taking samples using the purposive sampling technique. The purposive sampling technique is a technique used in taking research samples based on certain considerations.

Data collection techniques used in this study include observation, interviews, questionnaires, and critical thinking ability-based tests categorized based on Bloom's taxonomy at levels 4 to 6, namely analyzing, evaluating, and creating. This test contains two types of questions, namely posttest and pretest questions. Pretest questions are given before learning begins to determine the initial abilities of students and whether there is a difference between the experimental class and the control class. While the posttest questions are given after learning is given treatment to determine the final abilities of students between the experimental class and the control class.

The data processing and analysis techniques in this study used quantitative research with a quasi-experimental method that was analyzed using descriptive statistical techniques. The data obtained in the form of student pretest and posttest results were processed using the IBM SPSS Statistic 25 program. Analyzed using normality tests, homogeneity tests, independent samples t-tests, and improvement tests (n-gain scores).

The research procedures carried out in this study include the preparation stage, implementation stage, and reporting stage which are explained as follows:

1. Obtaining research permits at SMK Negeri 1 Slawi as a research location and making agreements with collaborating teachers.
2. Conducting initial observations.
3. Compiling and creating learning tools in the form of lesson plans, modules, animated videos, and research instruments that have been prepared.
4. Validating learning tools

5. Conducting research by applying a problem-based learning model assisted by animated videos on KD 3.8 material calculating the cost of production for creative products and entrepreneurship subjects.
6. Processing data in the form of pretest and posttest scores from the experimental class and control class which were then analyzed using a different test, namely the independent samples t-test.

Result and Discussion

The results of the study obtained were the pretest and posttest scores of class XI BDP 4 students as the experimental class and class XI BDP 2 as the control class, a questionnaire on student involvement in learning by implementing the problem-based learning model assisted by animated videos on the subjects of creative products and entrepreneurship. Data in the form of class pretest and posttest scores were analyzed using descriptive statistics with the IBM SPSS Statistic 25 program which are presented in the following table:

Table 1. Descriptive Statistics Results of Learning Outcomes

Score	Min	Max	Mean
Pretest Eks	20	100	62
Posttest Eks	50	100	79
Pretest Control	10	100	63
Posttest Control	40	100	71

Source: Research Data Processed, 2021.

In Table 1 above, it is known that from 10 critical thinking ability questions in the form of multiple choice pretest and posttest questions worked on by students, there are differences in results. The average pretest score of the control class is higher than the experimental class. However, the average pretest scores of both

classes are still low and have not reached the Minimum Completion Criteria (KKM) standard score determined by the school, which is 75. In the experimental class, only 34% achieved the complete category, which is 12 students, so there are still 23 students who have not achieved the completeness score. In the experimental class, only 25% achieved the completeness score, which is 9 students, so there are still 27 students who have not achieved the completeness score.

During the learning process, treatment was given in the form of implementing a problem-based learning model assisted by animated videos in the experimental class or class XI BDP 4, while in the control class or class XI BDP 2, the learning model commonly used by the teaching teacher was implemented, namely the problem-based learning model without the help of media. After the treatment was given in each class, the results can be seen in Table 1 showing an increase in the average posttest score of the experimental class and the control class. However, the average posttest score of the experimental class was higher and had reached the Minimum Completion Criteria (KKM) standard than the control class which had increased but had not yet reached the KKM score. In the experimental class, there was an increase in students who achieved the KKM score of 18 students, while in the control class, 16 students achieved the KKM score.

Based on the pretest and posttest data obtained, a prerequisite test was then carried out before the hypothesis test was carried out. The prerequisite tests used were the normality test and the homogeneity test. The following are the results of the normality test and the homogeneity test processed using the IBM SPSS Statistic 25 program, which can be seen in Table 2 and Table 3 below:

Table 2. Results of the Kolmogorov-Smirnov Normality Test

Kelas	Sig.
Pretest Experiment	,113
Posttest Experiment	,052
Pretest Control	,068
Posttest Control	,154

Source: Research Data Processed, 2021.

In Table 2, the normality test shows that the significance values of the pretest and posttest results for both the experimental and control classes are greater than 0.05 (sig. > 0.05). This indicates that the pretest and posttest data are normally distributed.

The next prerequisite test is the homogeneity test for the pretest and posttest data of the experimental and control classes, as presented in Table 3 below:

Tabel 3. Results of Pretest and Posttest Homogeneity Test

Class		Sig.
Pretest Experiment and Control	Based on Mean	,666
Posttest Experimen and Control	Based on Mean	,126

Source: Research Data Processed, 2021.

In Table 4, the pretest homogeneity test shows a significance result of more than 0.05 (Sig. > 0.05). This means that each pretest and posttest question that has been worked on by the experimental class or class XI BDP 4 and the control class or class XI BDP 2 has a homogeneous value variation or there is a similarity. This means that there is a similarity in the initial ability in the form of critical thinking skills of students regarding the understanding of the

material on calculating the cost of production before being given treatment or treatment in each class.

The results of the posttest homogeneity test show a significance value of more than 0.05 (sig. > 0.05). So it can be concluded that the variation of the posttest values that have been worked on by class XI BDP 2 and class XI BDP 4 is homogeneous or the same. This means that after the application of the problem-based learning model assisted by animated videos in class XI BDP 4 as the control class and the application of the problem-based learning model without the assistance of media in class XI BDP 2, there are similarities in students' critical thinking skills regarding the understanding of the material on production costs as evidenced by the variation in the posttest results of class XI BDP 4 and class XI BDP 2.

After conducting the prerequisite test, it is known that the pretest and posttest data are normally distributed and homogeneous, and then the pretest and posttest data of the experimental class and control class can be tested for a hypothesis, namely the independent samples t-test. There are two requirements for decision-making in the independent samples t-test,

Table 4. Results of Independent Samples T-Test Pretest

Test	**T-Test for Equality of Means**
	Sig (2-tailed)
Pretest Experiment and Control	,804

Source: Research Data Processed, 2022.

Based on Table 4, the sig. (2-tailed) value is > 0.05, **so H0 is accepted and, Ha is rejected**. This means that there is no difference in the average pretest results between class XI BDP 4 as the experimental class and class XI BDP 2 as the control class. Both

the experimental class and the control class have the same initial abilities before being given treatment.

Table 5. Independent Samples T-Test Posttest Results

Test	T-Test for Equality of Means
	Sig (2-tailed)
Posttest	,804

Source: Research Data Processed, 2022.

Based on Table 5, it is known that the sig. (2-tailed) value <0.05, then H0 is rejected and Ha is accepted. This means that there is a difference in the average posttest results between class XI BDP 4 as the experimental class and class XI BDP 2 as the control class. The results of the hypothesis test in this study are in line with the research conducted by Sasmita & Harjono, (2021) where the output results of the independent samples T-test at t count are greater than t table, namely 10.201> 2.018 and a significance value of 0.000 <0.05, which means that H0 is rejected and Ha is accepted. This means that there is a significant difference in the effectiveness of the application of problem-based learning and problem-posing models on improving critical thinking skills and student learning outcomes.

To find out whether there was an increase in students' critical thinking skills in the experimental class or the control class before and after being given treatment during the learning process, an increased test or n-gain score was carried out. The n-gain score test was processed using IBM SPSS Statistics 25. The following are the results of the n-gain score test presented in table 6 below:

Table 6. Gain Test Results (n-gain score)

Class		Statistic
Experiment	Mean	0,2730
	Maximum	1,00
	Minimum	-2,00
Control	Mean	0,0922
	Maximum	1,00
	Minimum	-3,00

Source: Research Data Processed, 2022.

In Table 6, the results of the test of improvement or n-gain scores of the experimental class and the control class both experienced an increase. The n-Gain score in each class can be seen in the mean column. In this case, if you look at the n-gain classification table, it is concluded that the experimental class experienced an increase in critical thinking skills with a low category. In the control class, there was also an increase in critical thinking skills with a low category. Although both classes experienced an increase in the low category, the n-gain score of the experimental class was higher than the control class. The increase in ability with a low category was due to the level of student attendance in participating in online learning using Zoom meetings which was not optimal due to network constraints.

The effectiveness of the problem-based learning model applied to provide an effect on increasing students' critical thinking skills can be seen from the results of the independent samples t-test post-test or the posttest difference test in Table 6, the results of the independent samples t-test posttest which stated that there was a difference in the average posttest results in class XI BDP 4 as the experimental class and class XI BDP 2 as the control class. In addition, the average post-test score of the experimental class was higher than the control class, which can be seen in Table 2 of the results of the statistical analysis of learning outcomes.

The achievement of critical thinking skills of class XI BDP 4 students as an experimental class increased, which was indicated by an increase in posttest results because, during learning, treatment was given in the form of implementing a problem-based learning model assisted by animated videos that provided an atmosphere during teaching and learning activities that supported students in using their critical thinking skills. This learning model presents a problem and will arouse students' curiosity to investigate the problem so that when students conduct an investigation, they will use their critical thinking stages (Kono et al., 2016).

In addition, the problem-based learning model assisted by animated videos improves the thinking skills of class XI BDP 4 students due to student involvement or the role of students in learning. In this case, students who involve themselves directly during learning are allowed to use the initial knowledge they have in interactive activities during learning (Herawan & Rahayu, 2015). Gunantara et al., (2014) also stated that the problem-based learning model is a learning model that provides facilities for students to develop critical thinking and higher thinking skills.

The following are the results of the student involvement questionnaire in learning which are presented in Figure 2 below:

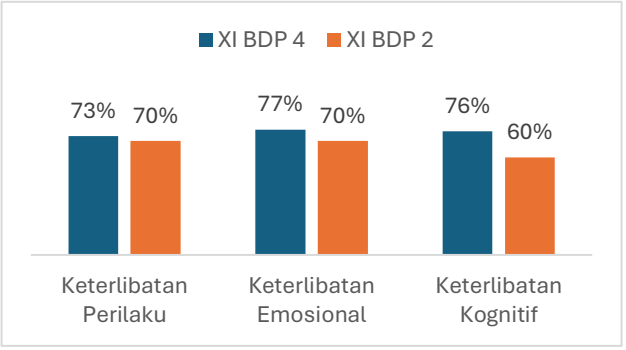

Figure 2. Percentage Graph of Student Engagement Indicators

In Figure 2, student engagement in learning in class XI BDP 4 as an experimental class reached a higher percentage of the three indicators measured than in class XI BDP 2 as a control class. Student engagement plays an important role because it can support the implementation of the learning process well (Reeve, 2012). Based on the results of the questionnaire, student engagement in learning in class XI BDP 4 gave a fairly good response. One of them is the indicator of cognitive engagement in class XI BDP 4. Cognitive engagement in learning is very helpful in improving students' critical thinking skills because, during learning, student involvement is not only physical but also involves the mind, which includes students paying attention, concentrating, participating, and having the will to try to achieve their abilities (Fikrie & Ariani, 2019). This is supported by field findings regarding learning activities involving students in class XI BDP 4, 14 students in the class have involvement in learning with a very active category.

Based on field findings regarding student activities in learning in class XI BDP 4 which was given treatment with the application of the problem-based learning model assisted by animated videos, it made students active in learning and enthusiastic about participating in learning from beginning to end. This is because the teacher uses animated video-based learning media which aims to provide stimulus and increase student motivation during learning. Nasral & Meliandika, (2022) stated that the use of animated media in presenting material during learning can affect the increase in attention, enthusiasm, motivation, and memory of students during teaching and learning activities.

With animated videos in learning, students use two senses at once, namely not only hearing but seeing directly what is shown in the video, namely in the material on calculating the cost of production. That way, students will find it easier to remember and improve their understanding of the material and their critical

thinking skills. In addition, the learning process assisted by animated media provides space for students to find answers based on broader knowledge. When looking for answers to a problem, students will analyze according to the information obtained and determine based on the results of the analysis so that students' critical thinking skills increase (Wahyuni et al., 2018).

During the learning process, there are student activities in the form of discussions with groups to complete case studies given by the teacher. This activity involves student behavioral involvement which refers to the role and direct involvement in academic activities. As seen in Figure 2, the indicator of student involvement in class XI BDP 4 reached 73%, meaning that out of a total of 25 students, 25 students paid attention during learning, listened to the teacher's instructions, and contributed during discussions with their groups. Student behavioral involvement is one of their efforts to be able to contribute during learning in class through their involvement such as obeying applicable class rules, focusing during learning, and listening carefully to the teacher's instructions (Kaensige & Yohansa, 2018). With this, there will be stimuli that influence students in developing their critical thinking skills. Nafiah, (2014) stated that the learning experience of students who are faced directly such as discussing and then being given a problem can increase the development of their critical thinking skills

The increase in critical thinking skills of students in class XI BDP 4 also affects the learning outcomes achieved. For students who experience increased critical thinking skills, the learning outcomes obtained by students also increase with the application of the problem-based learning model during classroom learning (Husnah, 2017). In this case, the increase in learning outcomes in class XI BDP 4 is due to the application of the problem-based learning model assisted by animated videos. The following are the learning outcomes of class XI BDP 2 and XI BDP 4 which can be seen in Figure 3 below:

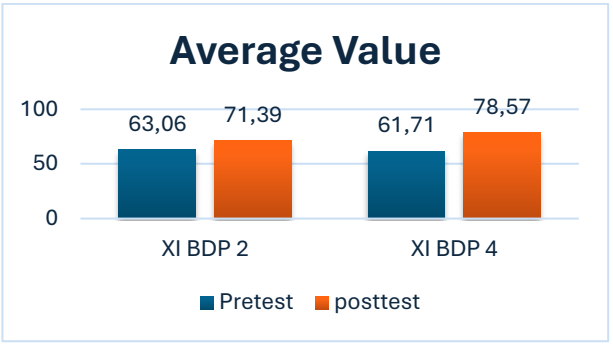

Figure 3. Average value of XI BDP 2 and XI BDP 4
Source: Processed research data, 2022

According to Figure 3, the average value of XI BDP2 and XI BDP 4, both classes experienced an increase in learning outcomes after being given treatment. The posttest score in the experimental class was higher and had reached the KKM than the control class. The difference in learning outcomes was indicated by students in the experimental class having previously read and studied the module given by the teacher related to the material on calculating production costs, actively participating during learning, paying serious attention to the animated video display, and being involved in discussing completing case studies with their respective groups.

This is supported by the statement of Riskiyani et al., (2016) that by implementing a problem-based learning model assisted by animated media, students gain their own learning experience and help students solve problems in the form of case studies or practice questions given by the teacher, thus creating two-way interaction, namely the teacher and students, as well as fellow students. The existence of this two-way interaction affects the improvement of student learning outcomes.

Conclusion

Conclusion

Based on the description of the results and discussion of the research on the effectiveness of the problem-based learning model assisted by animated videos in improving the critical thinking skills of class XI BDP students of SMK Negeri 1 Slawi in the subject of creative products and entrepreneurship, it can be concluded that the problem-based learning model assisted by animated videos is effective in improving students' critical thinking skills in class XI BDP 4. This is evidenced by the difference test or independent samples t-test showing a difference in the results of the average posttest score in class XI BDP 4 which is higher and has reached the KKM value than class XI BDP 2. In the increased test or ¬n-gain score, class XI BDP 4 showed higher results than class XI BDP 2. In addition, based on the results of the student involvement questionnaire in learning, class XI BDP 4 is more active than class XI BDP 2. This indicates that there is an increase in the critical thinking skills of class XI BDP 4 students who apply the problem-based learning model assisted by animated videos.

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