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(Research) Article

Effectiveness of the 3CM Learning Model Assisted by Differentiated Learning Modules to Improve Learning Achievement and Critical Thinking Skills

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Abstract: A teacher's success in teaching can be observed through student learning outcomes. One of supporting factors for successful teaching is the used of learning model. This research aims to determine the effectiveness of Cool-Critical-Creative-Meaningful (3CM) Learning Model Assisted by Differentiated Learning-Based Learning Modules to improve the academic achievement and the critical thinking skills of students at SMA Negeri 8 Malinau. This study employed a quantitative approach, with a quasi-experimental research method using a pretest and a posttest designs. The population consisted of 12th grade students of SMA Negeri 8 Malinau, with 60 students sample divided into 2 classes, experimental class and control class, depended using a non-probability sampling technique. The experimental class is a class that is treated in the form of 3CM learning model assisted by differentiated learning-based learning modules, while the control class received a conventional treatment. Data collection for measuring learning outcomes and critical thinking skills was carried out through validated and reliable tests. Data analysis techniques used a homogeneity test with the F test and a hypothesis test with an Independent Sample T test. The results showed that: 1) the average of student learning outcomes in the experimental class was 75,50, higher than the students in the control class, which was 65,50; and 2) the average of critical thinking skills test outcomes in the experimental class was 81,22, higher than that of the control class, which was 61,47. From these results, it was concluded that the 3CM learning model assisted by differentiated learning-based learning modules was effective in improving student's learning outcomes and critical thinking skills.

Keywords: Academic Achievement; Critical Thinking Skills; Differentiated Modules; Learning Outcome; 3CM Learning Model.

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1. Introduction

Education is one of the foundations for advancing a nation, including Indonesia. Quality education will drive scientific and technological advancement, thereby improving the quality of human resources (HR). By improving the quality of human resources, Indonesia will be ready to compete with other nations. A 2018 survey by the Institute for Health Metrics and Evolution (IHME) reported that Indonesia's human resource quality ranked 131st globally. The Program for International Student Assessment (PISA) (2018) reported that Indonesian students were low performers in literacy, mathematics, and science. This was based on PISA test results, which tested analytical thinking and problem-solving skills. Furthermore, the PISA report showed that Indonesian students failed to correctly complete national exams and state university entrance exams, which used higher-order thinking questions.

Meanwhile, at the regional level, statistical data from the 2022 Computer-Based Written Examination (UTBK) showed that not a single high school in North Kalimantan Province ranked among the top 100 nationally. Even at SMA Negeri 8 Malinau, a high school in North Kalimantan Province, only a few students passed the 2022 Computer-Based Test (UTBK). Most of the UTBK questions are HOTS (Higher Order Thinking Skills) level, requiring students to think critically to complete them. Consequently, many students make errors in choosing answers. This reflects students' low critical thinking skills, which is also a contributing factor to the low test scores at SMA Negeri 8 Malinau. Based on the annual learning evaluation at SMA Negeri 8 Malinau, one contributing factor to the low critical thinking skills is that teachers continue to rely heavily on conventional learning models in classroom management.

SMA Negeri 8 Malinau is located in a 3T (Disadvantaged, Frontier, and Outermost) area, with very limited school facilities. The school has implemented the Independent Curriculum since 2022, but classroom learning still uses conventional models. This is due to the lack of supporting facilities and the varying abilities of students in absorbing the material. To address this issue, it is necessary to implement learning models that can improve students' critical thinking skills and develop learning modules that accommodate the differences in students' abilities in understanding the subject matter.

Research conducted by Maha Putra et al. (2018) on students' critical thinking skills in economics showed that students' abilities are still relatively low. The study also found that the average scores for the odd-semester exams of four social studies classes all fell below the Minimum Completion Criteria (KKM). The study concluded that students struggle to solve HOTS problems due to their low critical thinking skills. This low critical thinking ability is partly due to teachers still using conventional learning models, which do not hone students' critical thinking skills.

The 3CM learning model is one that can develop students' critical thinking skills. According to Wahyudi et al. (2019), the 3CM learning model adopts contextual learning, realistic mathematics, and meaningful learning from Brownel and David. In this learning model, students are guided to think critically in providing solutions to problems. With this model, students are then encouraged to develop a product as a result of implementing the previous concept. In this way, students' critical thinking skills can be honed and improved.

Research conducted by Wahyudi and Budi Waluyo (2019) examined the effective use of the 3CM learning model to help students solve math problems creatively and critically. The study used a single group with the same treatment and only tested students' critical thinking skills. The 3CM learning model has been shown to improve student learning outcomes, according to research conducted by Friska Simanjuntak (2021). In this study, the 3CM model was implemented using the College Bowl Strategy.

The researchers will implement the 3CM learning model with the aid of differentiated modules and measure improvements in student learning outcomes and critical thinking skills. The study will be conducted with two groups of classes with different treatments. The experimental class will receive instruction using the 3CM learning model with the aid of differentiated modules, while the control group will learn using a conventional learning model with varied lectures.

Based on the background of the problem above, this study will analyze the effectiveness of the 3CM learning model assisted by a differentiated learning module with adjustments to the research location and available facilities and infrastructure. The differentiated module, which has previously undergone expert validity testing, is expected to help maximize the 3CM learning model to improve students' learning outcomes and critical thinking skills.

2. Literature Review

2.1. *Grand Theory* : Theory Study Constructivism

Constructivism is philosophy learners contextual Which believes that knowledge is constructed by humans. This theory was developed by Piaget, who believed that knowledge is a self-construction in analyzing something. In general, construction means building, so in constructivism theory, construction can be interpreted as building knowledge. In contextual learning, constructivism is runway think that assume that knowledge built by humans A little for the sake of A little, Which the result expanded through context Which limited and not sudden. Humans must construct this knowledge and give it meaning through real experience (Thobroni & Mustofa. 2013).

Constructivism is a philosophy learning which based on the premise that with reflect experience, students build and constructing knowledge and understanding about the world in which one lives. Learning, thus, is merely a process of organizing one's mental models. To accommodate experiences new (Suryono & Hariyanto. 2014). From the explanations above, it can be concluded that constructivism theory provides freedom for students to actively and in a directed manner to learn to develop themselves and construct knowledge about what is being studied.

According to Masgumelar (2021), characteristics learning constructivism is: a) Active learning (active *learning)*. b) Student involved in activity learning nature authentic and situational. c) Activity Study must interesting and challenge. d) Students must can relate new information with information which have been previously owned by a process called "*bridging"*. e) Teachers play a greater role as facilitators who can help students construct knowledge. f) Teacher must can give help in the form of *scaffolding* which required by students in the learning process.

2.2. Draft Model Learning

The learning model is a series of teaching and learning activities from beginning to end of learning that describes The activities of teachers and students with the teaching materials used, as well as the interactions between teachers, students, and the teaching materials used. A learning model is often defined as a learning approach. Within a learning approach, there are plans and flows used as guidelines for implementing learning in the classroom.

2.3. Draft Model Learning 3CM

Success in activity learn how to teach can seen from whether or not learning objectives are achieved, so it is important for teachers to be able to choose the right learning model. The selection of a learning model is expected to hone students' critical thinking skills so that it can improve their learning outcomes. In addition, the model Learning must also be creative so that students do not get bored during classroom activities. One learning model that leads to critical and creative thinking skills is the 3CM (*cool-critical-creative- meaningful*) learning model.

The 3CM learning model was developed in 2018 and released in 2019. The 3CM model is a creative learning model that hones students' critical thinking skills in solving problems and implementing the solutions obtained. This learning model directs student for use brain right as source creativity, art, initiative, and intuition. According to Wahyudi (2019) model learning 3CM adopts learning contextual, realistic mathematics, and meaningful learning from Brownel and David. The 3CM learning model can construct knowledge and develop student creativity. 3CM also packed with creativity Teacher so that deep learning the class will not be boring and students will always active in each stage of learning. In the 3CM learning model, students are asked to think critical in give solution from a problem. Then, Students can think of a product as a result of implementing a previous concept. Based on the description above, the 3CM learning model is a creative learning model that hones students' critical thinking skills in solving problems and implementing the solutions obtained.

3. Method

The research method used in this study was a quasi-experiment using a nonequivalent pretest-posttest pattern (*nonequivalent control group design*). This type of design is almost similar to the *pretest-posttest control group design*, but in this design the research subjects are placed in the control group. And experimental group was not carried out randomly or random (Sugiyono, 2018). Because the subjects were not selected randomly, this study used a *non-probability sampling technique*. The selection of experimental research in this research used to test influence an action on a behavior or to test whether or not there is an effect of that action. In an experiment, action which implemented usually called *treatment* or giving a condition whose influence will be assessed.

4. Results and Discussion

The purpose of this study was to determine whether the 3CM learning model assisted by differentiated modules is more effective than conventional learning models in improving students' learning outcomes and critical thinking skills in the economics subject, chapter on the accounting cycle of service companies. The study was conducted to two class, class XII Pegasus as control and class XII Phoenix as class experiment. Each class consists of from 30 to determine the initial abilities of students, each group worked on pretest questions. Which amount to 20 question choice double And 2 question *essay* . After done each group was given a pretest for class action according to the plan which lasted for 3 meetings with a duration of 120 minutes in each meeting.

The results of this study as a whole show that there are differences in learning outcomes between the group with the 3CM learning model assisted by differentiated modules (experimental class) and the group given the model. Conventional learning (control class). Use of the 3CM learning model assisted by differentiated modules Also more effective in increase ability think critical students compared with use model learning conventional. Based on from the data analysis that has been carried out, the following points can be put forward:

4.1. Results Study class students experiment with model learning 3CM (*cool, critical, creative, meaningful*) with the help of higher differentiated modules compared to students who are given conventional learning models.

Comparison results Study class control and experimental class shows that the average value of the results of both classes has increased. Improvement in learning outcomes class experiment more tall compared to with improvement on control class. Improvement Which more tall on class experiment show that the use of the 3CM learning model assisted by differentiated modules is effective in improving learning outcomes. A comparison of improvements in learning outcomes in each class can be seen in the following diagram.

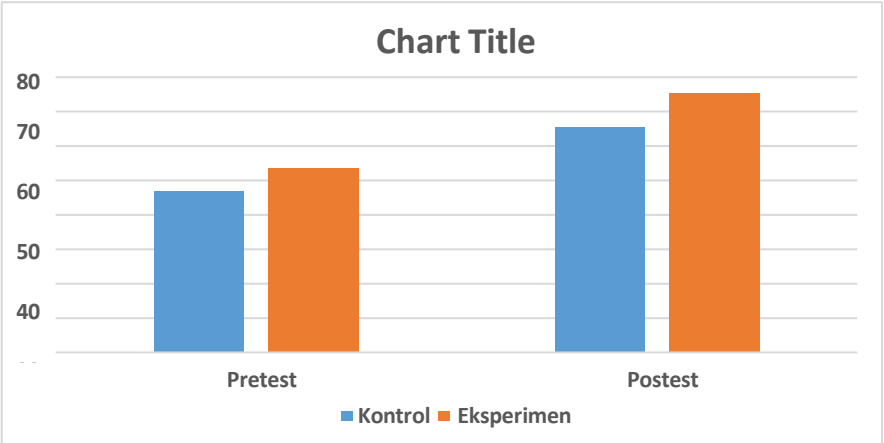

Figure 1. Diagram Comparison Results Study Class Control and Experimental Class.

Results research hypothesis testing shows that the learning outcomes of students who are given a model 3CM learning assisted by modules more differentiated than conventional learning models. The atmosphere in this experimental class is thick with student activity, preventing monotony and making teachers more enthusiastic in managing the learning activities. Visible different with learning conventional where role teacher in the class is more dominant, so students don't have the opportunity to think for themselves when solving problems. This situation makes most students appear bored.

Results study previously on eye lesson which different shows that the 3CM learning model can improve student learning achievement. The use of the 3CM learning model with the College Bowl strategy can improve performance student learning (Simanjutak, 2021). Increased yield student learning with model learning 3CM helped module differentiated because the 3CM learning model encourages students to be more active in learning activities so that students will explore the material more deeply with ability Alone And collaboration with Friend in One group. On At each meeting, students are given a problem that they must analyze to find a solution or answer to the problem presented. The search for this solution motivates students to delve deeper into the material so that they can find answer from every problem which presented. In solving problems, students are greatly assisted by the existence of differentiated modules, which students use as a source for solving problems independently.

The effectiveness of a learning method depends on the teacher's accuracy in determining a teaching and learning model that is tailored to the characteristics of the students and the subject matter to be presented to them. In this study, the 3CM learning model was found to be quite effective in improving student learning outcomes, especially with help Differentiated modules as a source of learning for students in solving the problems presented.

4.2. Students' Critical Thinking Skills with the 3CM Learning Model Assisted by Differentiated Modules Increased Higher Compared to Conventional Learning Models

The results of the study showed that both classes experienced an increase in critical thinking skills. The increase in the experimental class was higher than that in the control class. The increase in the experimental class indicates that the use of the 3CM learning model assisted by differentiated modules is effective in improving critical thinking skills. student. Comparison improvement ability think critical student in each class can be seen in the following diagram.

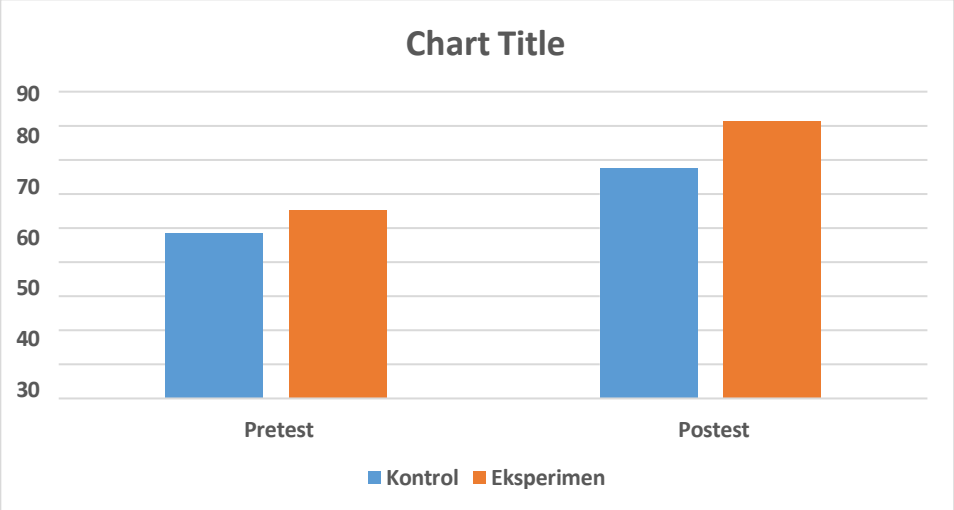

Figure 2. Diagram Comparison of Critical Thinking Skills of Control Class and Experimental Class.

The results of the hypothesis test indicate that the use of the 3CM learning model assisted by differentiated modules can improve students' critical thinking skills to a greater extent than the use of conventional learning models. The 3CM learning model can also improve junior high school students' critical thinking skills through two different creative activities (Risti & Prihatnani, 2021). Providing students with problems or questions should hone their critical thinking skills. Solving problems involves more than just memorizing source material; students should also hone their ability to analyze, synthesize, solve problems, draw conclusions, and evaluate. By honing these skills, students' critical thinking skills will indirectly improve. Critical thinking indicators are found in the syntax of the 3CM learning model, thus improving this learning model's ability. think critical in a way effective. Moment activity In learning, students are given problems to which they must find answers by exploring, analyzing, and guiding them to create creative products. This will allow students to be more active in the classroom learning process, creating a pleasant atmosphere.

Before the action was carried out, students were given essay questions to determine their initial critical thinking skills. After the action was carried out action during three time meeting student given question essay which the same to hone whether their critical thinking skills have improved or not. After getting the results of the test, data testing was carried out, including normality testing and homogeneity and hypothesis testing. From all tests that have been done the results showed that the 3CM learning model assisted by differentiated modules can improve ability think critical more students tall and effective compared to model learning conventional. Model learning 3CM in a way can effectively help improve the ability to solve mathematical problems creatively and critically (Wahyudi & Waluyo, 2017).

5. Conclusions

The 3CM learning model, supported by differentiated modules, is more effective in improving student learning outcomes compared to conventional learning models. This can be seen from the fact that the group of students given the 3CM learning model, supported by differentiated modules, had higher learning outcomes than students given the conventional learning model.

The 3CM learning model, supported by differentiated modules, is more effective in improving students' critical thinking skills compared to conventional learning models. This can be seen from the fact that the group of students given the 3CM learning model, supported by differentiated modules, had higher critical thinking skills than students given conventional learning models.

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