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Case Method-Based Learning in AUTOCAD-Assisted CAD Program Courses

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Abstract

The purpose of this research is to increase students' understanding of CAD program courses through the application of the case method learning model. This type of research is Classroom Action Research (CAR). This research was conducted to find solutions that can be done so that the potential of each teaching participant can be explored optimally. The subjects of this study were the fourth semester students of the Building Engineering Education Study Program, University of Nias, who at the time of this research were contracting 22 CAD courses. The method of measuring the level of success is carried out in three cycles. The method of data collection was carried out by observation, performance tests, quantitative and qualitative data collection, and data analysis techniques of learning implementation. Based on the results of data analysis and discussion, it was found that the most dominant activity of lecturers in providing lecture material using autocad media could increase student understanding by 0.47 points from cycle 1 to cycle 2 while the increase from cycle 2 to cycle 3 was 0.04 points. Activities in providing explanations to student questions using autocad media can increase student understanding by 0.25 points from cycle 1 to cycle 2 and increase student understanding by 0.27 points. The mastery of students' cognitive learning outcomes increased from cycles 1 to 3, with the percentage of mastery in cycle 1 being 31.82% and cycle 2 being 54.54%, and in cycle 3 being 90.9%. So it is concluded that the application of the case method learning model assisted by autocad media can improve students' understanding of the CAD program material.

Keywords: *Case method, autocad, learning outcomes*

Abstrak

Tujuan penelitian ini untuk meningkatan pemahaman mahasiswa pada mata kuliah program CAD melalui penerapan model pembelajaran case method. Jenis penelitian ini adalah Penelitian Tindakan Kelas (PTK). Penelitian ini dilakukan untuk mengetahui solusi yang dapat dilakukan agar potensi masing-masing peserta ajar dapat digali secara optimal. Subyek penelitian ini adalah mahasiswa semester IV Program Studi Pendidikan Teknik Bangunan, Universitas Nias yang pada saat penelitian ini dilakukan sedang mengontrak mata kuliah program CAD berjumlah 22 orang. Metode pengukuran tingkat keberhasilan dilakukan dalam tiga siklus. Metode pengumpulan data dilakukan dengan observasi, tes kinerja, pengumpulan data kuantitatif dan kualitatif, dan teknik analisis data keterlaksanaan pembelajaran. Berdasarkan hasil analisis data dan pembahasan didapatkan bahwa aktivitas dosen yang paling dominan dalam memberikan materi perkuliahan menggunakan media autocad dapat meningkatkan pemahaman mahasiswa sebesar 0,47 poin dari siklus 1 ke siklus 2 sedangkatan peningkatan dari siklus 2 ke siklus 3 sebesar 0,04 poin. Aktivitas dalam memberikan penjelasan terhadap pertanyaan mahasiswa menggunakan media autocad dapat meningkatkan pemahaman mahasiswa sebesar 0,25 poin dari siklus 1 ke siklus 2 dan peningkatan pemahaman mahasiswa sebesar 0,27 poin. Ketuntasan hasil belajar koginitif mahasiswa secara mengalami kenaikan dari siklus 1 sampai 3, dengan persentase ketuntasan siklus 1 sebesar 31,82 % dan siklus 2 sebesar 54,54 %, dan pada siklus 3 menjadi 90,9%. Jadi disimpulkan bahwa penerapan model pembelajaran *case method* berbantuan media autocad dapat meningkatkan pemahaman mahasiswa tentang materi program CAD.

Kata Kunci: *case method, autocad*, hasil belajar

INTRODUCTION

Education is a major investment as well as a central issue for a developing country in building its nation. Related to this, educational activities are a process of changing the ability of thinking patterns, memory, skills and human attitudes in solving problems from a certain condition to other conditions that are better (Dakhi, 2022, Zagoto et al., 2019).

The development of science and technology in the world of education is very rapid and has a very positive impact. Technological advances can make the teaching and learning process easier (Dakhi et al., 2020; Masril et al., 2020; Novelinda et al., 2020). There are two very important elements as one of the determinants of success in learning, namely teaching methods and learning media. The selection of teaching methods and the use of media must be appropriate and effective in order to be successful in the teaching and learning process in the classroom (Fajra et al., 2020; Timor et al., 2020; Zagoto, 2022).

The problems faced by students majoring in Building Engineering Education are the low achievement of students in the CAD Program course, and the students' AutoCAD ability after completing this course is still low. Building Engineering Education majors have the potential to benefit from using AutoCAD, which students will need when they enter the workforce. This should be supported by learning modules that give students the opportunity to learn independently and help them develop their skills.

Based on the observations that have been made, it can be seen that students' understanding of the CAD program courses is considered to be still not optimal, even though they are able to solve the questions given. Maximum ability can be demonstrated by the way students really know about the learning objectives that are applied in the form of material works or writings in the form of analysis of sub-chapters with the industrial world.

The low learning achievement of students tends to be caused by the lack of student activity in the process of learning activities, as well as students' low understanding of basic competencies in software application subjects such as operating AutoCad software and drawing 2 and 3 dimensional shapes. This lack of basic understanding causes students to have difficulty accepting the next material.

To improve student understanding, there is a need for synergy between students, teachers, and the media being taught which is an absolute requirement for the formation of a good teaching and learning environment. The teacher is not the only active resource person in a lecture, on the contrary, the teacher only acts as a facilitator who will direct students to learn the material to be taught. Student activity determines the achievement of learning objectives which should be centered on student efforts to develop science through the creativity of these students to find various learning resources but still through teacher guidance. Moreover, nowadays, technology development is very fast. So that easy access to find information can be done with various media.

The success of the education mechanism is influenced by a continuous process of planning, implementation and supporting policies. Law Number 20 of 2003 explains that education is a conscious and planned effort to create learning activities and learning processes so that students and educators actively develop their potential to have the capabilities and skills needed by themselves, society and the state. Therefore, in the learning process, the role of educators is crucial as facilitators and identifiers of the various advantages and disadvantages of each learning method that will be applied so as to create an effective learning.

The learning model that is recommended to be used in the 2013 curriculum is a student-oriented learning model, one of which is the Project Based Learning model. And the case method (Nugroho et al., 2018; Telaumbanua et al., 2020). In general, it can be said that the case method is formed in problem-based or case-based learning. Its application is very relevant in supporting Student Center Learning by designing and designing previous cases. And it is suspected that the case method learning model is very influential in developing problem solving-based abilities (Chen et al., 2016).

The case method teaching method is a highly adaptable teaching style that involves problem-based learning and promotes the development of analytical skills (Timor et al., 2020; Widiastuti et al., 2022; Zagoto & Dakhi, 2018). By presenting content in a narrative format accompanied by questions and activities that encourage group discussion and problem solving of complex problems, case studies facilitate the development of higher levels of Bloom's cognitive taxonomy in learning; move

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beyond the memory of knowledge to analysis, evaluation, and application (Kulshrestha, 2021)

The case method is practiced in the following order: independent case study before class, small group discussion before or during class, and large in-class discussion group discussion with the whole class. And he explained that students are required to review cases in order to identify problems and to research additional knowledge. Preparatory work is carried out independently and in student study groups and it provides a basis for thorough discussion of key issues relevant to the problems posed in this case (Mahdi et al., 2020).

Based on the identification of the problems above, the research will only discuss efforts to improve students' understanding of the subject matter of the CAD program through the application of the case method learning model.

METHOD

This type of research is Classroom Action Research (CAR). This research was conducted to find solutions that can be done so that the potential of each teaching participant can be explored optimally. The subjects of this study were students of the Building Engineering Education Study Program, University of Nias, who at the time of this research were contracting 22 CAD courses. The method of measuring the level of success is carried out in three cycles. The method of data collection was carried out by observation, performance tests, quantitative and qualitative data collection, and data analysis techniques of learning implementation.

Data collection techniques are carried out by: Observations made during the learning process. Learning observations are carried out directly during learning. As an observer in this study, one of the lecturers in the course. The method of observation is carried out to determine the implementation of learning by using the case method model. Performance test is used to determine student competence in analyzing crystal structure in Materials Science I course after being given treatment. Data collection uses qualitative and quantitative methods. Data Analysis Techniques to determine the results of the application of the discovery learning model in learning activities, data analysis needs to be carried out. In this study, using qualitative descriptive analysis techniques to determine the description of student learning completeness, during the learning process.

RESULTS AND DISCUSSION

1. Lecturer Activities During the Learning Process.

In Cycle 1 in providing motivation to students, lecturers have a dominant role, which is an average of 3.3. The value of 3.3 is the highest value of several criteria given. Meanwhile, the role of lecturers in explaining the material without using autocad media is considered less good, namely an average of 2.8. Meanwhile, for the clarity of lecturers in answering questions without involving autocad, they also received less response, namely 2.9.

In cycle 2 in providing motivation to students, lecturers have a dominant role, which is 3.42. The value of 3.42 is the highest value of several criteria given. Meanwhile, the role of the lecturer in explaining the material using Autocad media is considered capable of providing a positive response to students, which is 3.27. Meanwhile, for the clarity of lecturers in answering questions without involving autocad, they also received a less than 3.15 response.

In Cycle 3, in responding to student performance, the dominant role is 3.65. The value of 3.65 is the highest value of several criteria given. Meanwhile, the role of the lecturer in explaining the material using Autocad media is considered to be able to provide a positive response to students, which is 3.31. Meanwhile, for the clarity of lecturers in answering questions without involving autocad, they also received less response, which was 3.42.

2. Student Learning Outcomes

In cycle 1, student learning outcomes are measured by asking questions which are then answered orally by students. The questions asked are according to SAP. The minimum score for individual completeness is > 60. From the results of the assessment, it was found that student responses were still lacking when viewed by the number of students who met the

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completeness requirements were still 7 people and the % completeness obtained was still 31.82%. The number of completeness of these students is still not in accordance with what is required in the mechanical engineering department, which is 80% of students who complete.

In cycle 2, student learning outcomes are measured by asking questions which are then answered by students orally. The questions asked are according to SAP. The minimum score for individual completeness is > 60. From the results of the assessment, it was found that student responses were still lacking when viewed by the number of students who met the completeness requirements, there were still 12 people and the % of learning completeness was still 54.54% even though it had increased in the cycle. 1.

At this stage, student learning outcomes are measured by asking questions which are then answered orally by students. The questions asked are according to SAP. The minimum score for individual completeness is > 60. From the results of the implementation and assessment carried out in cycle 3, it was found that completeness was 90.9% or as many as 20 people. Completeness of student learning each cycle as shown below.

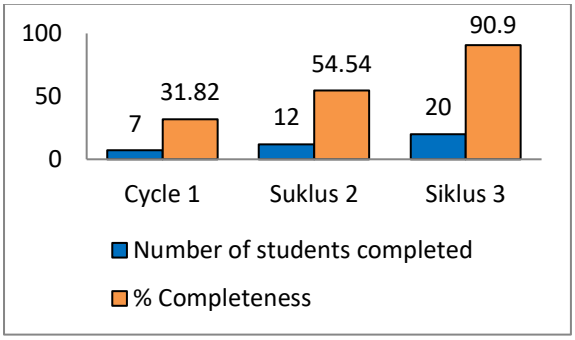

Figure 1. Mastery of Student Learning

Based on the graph above, it can be seen that student mastery is increasing from cycle one which initially only completed 7 students until cycle 2 increased to 12 people. Then in cycle 3 to 20 people. Students' mastery in cycle 3 has met the requirements of completeness, which is 80% of students who complete, that from the graph it can be seen that the use of autocad media can increase students' understanding of the CAD program material.

CONCLUSION

Based on the results of data analysis and discussion, the researchers can conclude that through the application of the case method learning model and the use of Autocad media, it is proven to be able to improve students' understanding of CAD program courses. The use of the AutoCAD program is very helpful in facilitating students to understand the CAD program material well.

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