3rd Malikussaleh International Conference on Multidiciplinary Studies 2022 (3rd MICoMS 2022)

IINTERNATIONAL CONFERENCE PROCEEDINGS 00011 (2022)
E-ISSN: 2963-2536 | DOI: https://doi.org/10.29103/micoms.v3i.170

Analysis of Student Ability in Using the AutoCAD Program in Civil Engineering Study Program Faculty of Engineering University Muhammadiyah of Aceh

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ABSTRACT
Every world of business and world of work (WBWW) needs human resources who can master and learn science and technology, which are continuously transforming. Civil engineering jobs include designing, constructing, maintaining, and repairing buildings. Auto Computer Aided Design (AutoCAD) technology software is very useful for civil engineering work when designing buildings. All WBWW in the field of civil engineering uses AutoCAD software when designing engineering, so human resources working in this field must be able to master AutoCAD software. On this basis, graduates of civil engineering are required to be able to master and operate application programs in the field of engineering. In the field of construction, human resources who are proficient in using AutoCAD are much needed. The Faculty of Engineering (FT) at the University Muhammadiyah of Aceh (UNMUHA) implements the use of AutoCAD in its curriculum. AutoCAD is one of the tools that supports the skills and development of the Civil Buildings Drawing (CBD) II Course. AutoCAD is an application program used for drawing, designing drawings, and testing materials. This research is to assess the frequency of the levels of mastery, skill, motivation, and discipline of Civil Engineering Study Program students at FT UNMUHA. The sampling technique used was purposive sampling, which is a sampling technique with the consideration that the respondents in this study were students of the Civil Engineering Study Program at FT UNMUHA who were active in the Even Semester of the 2021-2022 Academic Year and who programmed CBD II Course in their Study Plan Card (SPC), totaling 74 respondents. The results of this study indicate that students of the Civil Engineering Study Program at FT UNMUHA have high levels of mastery, interest, motivation, and discipline in completing drawing assignments using the AutoCAD application in the CBD II Course in the even semester of the 2021–2022 academic year.

Keywords: *AutoCAD, civil engineering, interest, motivation, discipline*

1. INTRODUCTION

The progress of the times goes hand in hand with the development of science and technology, especially in the field of information technology. Likewise with the needs of Human Resources (HR) in industry, the business world, and the world of work (BWWW). Every BWWW needs HR who can master and study science and technology, which are constantly transforming. This science and technology are very much needed for BWWW. In addition to speeding up work, it can also ease company operations, so it doesn't require a lot of HR in certain jobs.

Science and technology are also able to support company performance and help it survive in the face of global business competition. One of them is a job in civil engineering. Civil engineering jobs include designing, constructing, maintaining, and repairing buildings. Auto Computer Aided Design (AutoCAD) technology software is very useful for civil engineering work when designing buildings. [1]

All BWWW in the field of civil engineering uses AutoCAD software when designing engineering projects, so HR working in this field must be able to master AutoCAD software. On this basis, graduates of civil engineering are required to be able to master and operate application programs in the field of engineering. [2]

To anticipate this, the Civil Engineering Study Program, Faculty of Engineering, University Muhammadiyah of Aceh (UNMUHA) realizes the importance of using and implementing the AutoCAD software application for its students. Useful software adds to the skills of its graduates as stock skills while working at BWWW. [3]

In the last year, BWWW has been complaining a lot about HR, therefore the training institute invited the company's HR managers to take part in socialization regarding Labor Law No. 13 of 2003, so as not to cause a lot of questions and complaints from the company's HR managers regarding the Law. One of the biggest realities in Indonesia today is the high number of actions. On the other hand, the number of college graduates is increasing every year. [1]

The level of response, particularly in Aceh, has had its ups and downs. Based on data from the Central Statistics Agency (BPS) for Aceh Province, in 2019 the response rate in Aceh reached 6.17%. There was an increase in the anger rate of 0.42% in Aceh in 2020 to 6.59%. In 2021 there will be a decrease in the response rate in Aceh to 6.30 percent. [4]

The high rate of anger is caused by trainers who do not have specific skills in the field. Many BWWWs require workers with special skills, while the HR that registers does not have the skills needed by BWWW.

In the field of construction, HR who are proficient in using AutoCAD are much needed. Faculty of Engineering UNMUHA implements the use of AutoCAD in its curriculum. AutoCAD is one of the tools that support the skills and development of Civil Buildings Drawing (CBD) II. AutoCAD is an application program used for drawing, designing drawings, and testing materials. [5]

The program has the convenience and advantages of making images precisely and accurately. Students are required to understand the learning material in theory and practice. One of the subjects that must be mastered by students is CBD.

The Civil Engineering Study Program at Faculty of Engineering UNMUHA applies for CBD courses with face-to-face lecture sessions and works on drawing assignments using the AutoCAD program. This application is used in learning so that students have the knowledge and ability to create and describe drawing techniques as a language contained in images so that others can easily read and understand them. [6]

Graduates of the Civil Engineering Study Program Faculty of Engineering UNMUHA are expected to be able to work in areas of competency that are appropriate to their field of knowledge. At the beginning of the lecture, students who graduated already know and understand the use of the AutoCAD application, while students who graduated from high school are not familiar with the application. Students who are proficient in using the AutoCAD application are the learning outcomes of Course CBD II.

However, based on a survey conducted by researchers in direct interviews with students and looking at the final results of lectures in the CBD II Course in the Even Semester of the 2021/2022 Academic Year, of the 74 students who took the CBD II Course, only 10.81% were very proficient in implement AutoCAD. This shows that there are still many who cannot draw using the AutoCAD program. Based on the elaboration of these descriptions, the research intends to analyze the ability of students in the Civil Engineering Study Program, Faculty of Engineering UNMUHA, to use the AutoCAD program

The scope of this research remains focused on the problems and objectives that can be achieved, so there is a need for problem difficulty. The limitations of the problem in this study are as follows:

1. The results of the scores used in the Civil Building Drawing (CBD) II course
2. The research was conducted on students of the Civil Engineering Study Program at Faculty of Engineering UNMUHA Even Semester 2021/2022 Academic Year who took the CBD II course.
3. This study only determines the frequency of student mastery, interest, motivation, and discipline in completing assignments using the AutoCAD application.

2. RESEARCH METHODS

This type of research is called quantitative descriptive research. This study attempts to describe the level of interest, motivation, and discipline of students of the Civil Engineering Study Program, Faculty of Engineering,

UNMUHA, in using the AutoCAD application in the CBD II Course in the Even Semester of the 2021/2022 Academic Year.

The population in this study were students of the Civil Engineering Study Program, Faculty of Engineering, UNMUHA, who were active in the Even Semester of the 2021/2022 Academic Year as many as 940 students. The sample in this study was Civil Engineering Study Program students from the Faculty of Civil Engineering at UNMUHA who took the CBD II Course in the Even Semester of the 2021/2022 Academic Year, consisting of 74 students.

The sampling technique used was purposive sampling, which is a sampling technique with the consideration that the respondents in this study were students of the Civil Engineering Study Program at Faculty of Engineering UNMUHA who were active in the Even Semester of the 2021/2022 Academic Year and who programmed the course CBD II in their Study Plan Card (SPC). The reason for using this purposive sampling technique is that it is suitable for use in quantitative research, or studies that do not generalize. [7]

3. RESULTS AND DISCUSSION

RESULTS

Based on student AutoCAD application mastery variable data obtained from the results of completing the final exam at CBD II course, the student who obtained the lowest (minimum) score was 0 and the student who obtained the highest (maximum) score was 100.

Table 1. Frequency Distribution of Student Mastery of AutoCAD Applications

No	Category	Value Intervals	Frequency	Percentage (%)
1	Very Low	0 – 20	20	27
2	Low	20 - 40	5	7
3	Medium	40 - 60	5	7
4	High	60 - 80	34	46
5	Very High	80 - 100	10	13
	Total		**74**	**100**

Source: Primary data processed, September 2022

Based on the frequency distribution above, it can be seen that the highest frequency of student mastery of AutoCAD software applications is in the high category with 34 respondents and a percentage of 46%, so it can be concluded that the frequency of CAD mastery mastery among Faculty of Engineering UNMUHA Civil Engineering Study Program students who took Course CBD II in the Even Semester of the 2021/2022 Academic Year is in the high category. Based on the frequency distribution above, it can be described in a pie chart as follows:

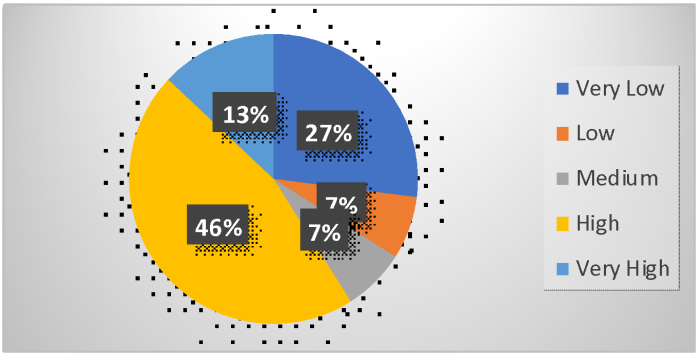

Figure 1. Pie chart of the frequency distribution of student CAD mastery

The level of students' ability to complete the CBD II Course assignments was 71.62% of students were able to complete AutoCAD assignments, and 28.38% of students did not complete assignments. The level of student ability in completing the CBD II assignment can be seen in the diagram below:

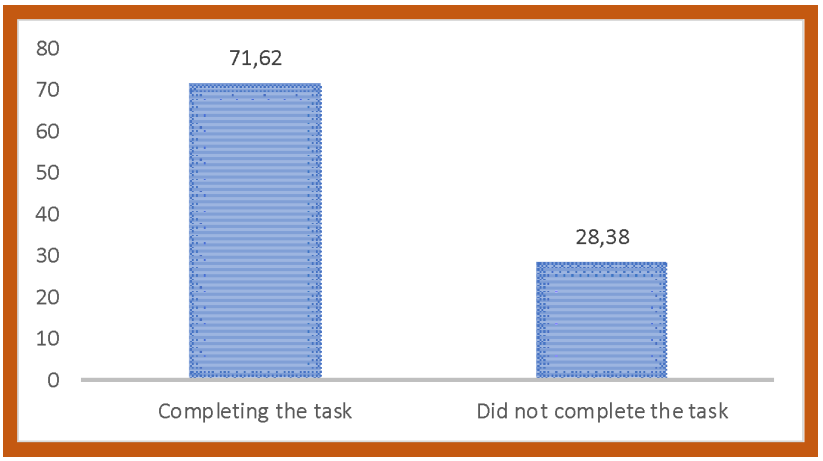

Figure 2. A bar chart depicting the levels of student ability in completing CBD II course assignments

Based on the final assessment, 34% of students failed and did not pass the CBD II course. Several factors cause the student to fail the course, including:

1. Insufficient attendance, students must achieve 70% attendance.
2. Students do not submit assignments given by lecturers.
3. Students do not take the Mid-Semester Examination (MSE)
4. Students do not take the Final Semester Examination (FSE)

The graduation rate of students in the CBD II subject can be seen in the following pie chart:

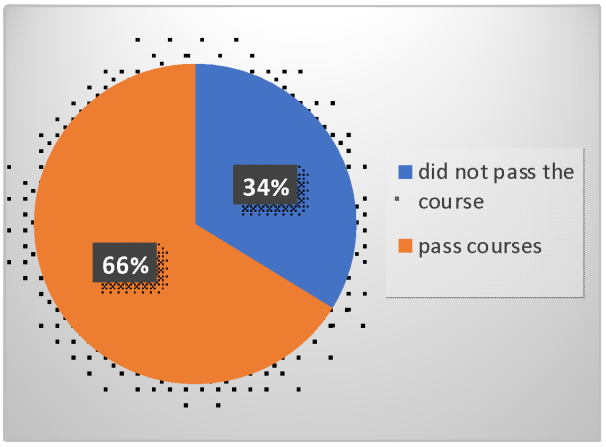

Figure 3. Pie chart of student graduation rates in CBD II Course

Based on variable data, the level of student motivation to learn the AutoCAD application can be seen in the following table:

Table 2. Frequency distribution of student motivation levels to learn the AutoCAD application

No	Category	Frequency	Percentage (%)
1	Low	23	31
2	Medium	25	34
3	High	26	35
	Total	**74**	**100**

Source: Primary data processed, September 2022

Based on the frequency distribution above, it can be seen that the highest value is the frequency of students' motivation to learn AutoCAD applications in the high category of 26 respondents with a percentage of 35%, so it can be concluded that the frequency of students' motivation levels to learn AutoCAD applications who took the Course CBD II in The Even Semester of the 2021/2022 Academic Year is in the high category. Based on the frequency distribution above, it can be described in a pie chart as follows:

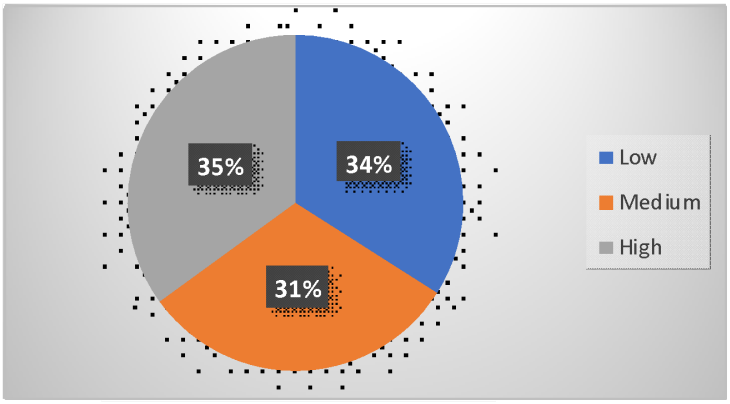

Figure 4. A pie chart depicting the frequency distribution of student motivation to learn the AutoCAD application

DISCUSSION

1. Student interest in using the AutoCAD program

Student interest in using the AutoCAD program, as shown by the descriptive analysis, is in the high category. This positive interest will give respondents the impression of students who have high enthusiasm for abilities that are stated perfectly, but what happens in the field is very different because students' abilities or skills in using the AutoCAD program are very minimal, as can be seen from the results of tests and interviews closed directly to the respondent concerned. From the results of the analysis, the authors found that students' interest in using the AutoCAD program was in the high category. This can be seen in Table 1, namely from the 74 student respondents who belong to the high category—as many as 34 respondents or 46%. The very high category is around 10 respondents or 13%; the medium category is around 5 respondents, or 7%; the low category is around 5 respondents, or 7%; and the very low category is around 20 respondents, or 27%. So, students' interest in using the AutoCAD program as indicated by the descriptive analysis is in the high category.

2. Student Motivation for Using the AutoCAD Program

Student motivation for using the AutoCAD program, as shown by descriptive analysis, is in the high category. This positive motivation will provide respondents—students who are eager to participate in AutoCAD learning at CBD II Course—with a clear sense of direction. The ability or skill of students in using the AutoCAD program is very minimal; this can be seen from the results of tests and closed interviews conducted directly with the respondents concerned. From the results of the analysis, the authors found that student motivation for using the AutoCAD program was in the high category. This can be seen in Table 2, namely, that of the 74 student respondents, 26 respondents, or 35%, fall into the "high" category. The "moderate" category is about 25 respondents, or 34%, and the very low category is 23 respondents, or 31%. So, as shown by descriptive analysis, the student's motivation to use the AutoCAD program is in the high category.

3. Student Discipline in Using the AutoCAD Program

Student discipline in using the AutoCAD program, as shown by the descriptive analysis, is in the high category. This can be seen in Figure 2 above regarding the level of student ability in completing AutoCAD application tasks at CBD II. The diagram shows that as many as 53 respondents, or 71.62%, were able to complete tasks promptly. The remaining 21 respondents, with a percentage of 28.38, were unable to complete their tasks.

4. CONCLUSION

Based on the results of data analysis and discussion, the authors conclude that students of the Civil Engineering Study Program, Faculty of Engineering, University Muhammadiyah of Aceh in the Even Semester 2021/2022 Academic Year have high levels of mastery, interest, motivation, and discipline in using the AutoCAD application to complete assignments for the CBD II course. They were able to complete their assignments promptly, although some students did not graduate. This was caused by the student's negligence due to several things, including 1) The percentage of attendance was not sufficient, namely 70%, 2) Student did not take the MSE, 3) Student did not take the FSE, and 4) Student did not submit assignments. Students must hone their skills in mastering the AutoCAD application to be accepted into BWWW, especially in construction.

AUTHORS' CONTRIBUTIONS

IRA DAMA YANTI serves as coordinator and is responsible for all research processes and operational activities, theoretical and literature reviews, research instrument reviews, and the preparation of research reports. MAIMUNAH carries out research operational activities and coordination, theoretical and literature reviews, research instrument reviews, implementation literature reviews, reviews research instruments, compiles research reports and publications, and protects intellectual property rights. MANOVRI YENI conducts operational research activities and coordinates with related parties, as well as the issuance of Memorandums of Understanding and Memorandums of Agreement with Partners. All authors cooperate to produce clinically and scientifically acceptable writing.

ACKNOWLEDGMENTS

The researcher would like to thank all students who have agreed to be respondents to this study. Researchers also thank all parties who have helped publish this research; hopefully, this research can be a reference or development for other researchers.

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