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The Effectiveness of Application Assistant Cybergogy Learning Model to Improve Student Learning Outcomes in Database Design Courses

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ABSTRACT
The learning paradigm in the 21st century requires technology and the use of appropriate learning models in vocational education. Therefore teachers must be able to choose the benefit of learning models to be applied. One of the learning models that can be used is the Cybergogy model, a learning model to create a conducive learning atmosphere to generate innovation and generate knowledge and emotions of students who use technology to conduct virtual learning. The purpose of the study was to determine the effectiveness of the application of the application-assisted cybergogy model to improve student learning outcomes. The research method used is a quasi-experimental non-equivalent control group. There is an experimental class and a control class. The research results show that there is an increase or difference in student learning outcomes using conventional learning models (73.14) via teleconference with application-assisted cybergogy learning models (82.61). The cybergogy learning model also increased the number of students who got good grades (93.75%) compared to the number of students who did not apply the treatment (87.50%), or 64% of the student population took database design courses. This increase in learning outcomes is due to the application-assisted cybergogy learning model providing flexibility for students to explore various lecture materials from discussion of material without being limited by time and place, discussion of material that is fun because it is presented in text and video formats, discussions that can run online between students and lecturers, and there is a simulation test that measures the level of mastery of lecture material

Keywords: *Cybergogy Model, LMS Application, Teacher Center Learning.*

1. INTRODUCTION

Accuracy in choosing a learning model will positively impact the mastery of learning materials by learners. The learning model must refer to the latest conditions of the era being lived to meet the demands for competence. The 21st century requires mastery of global awareness, financial literacy, business and entrepreneurship, national awareness, health literacy and environmental literacy. [1]. so that students can think critically, interpret science in life, and collaborate with technology [2]. The pedagogical approach in 21st-century learning is not able to accommodate the pace of scientific development along with the rapid growth in the use of information technology, and an adult learning model is needed with the independence and flexibility of students to choose content, strategies and assessments from the availability of learning resources. Collaboration learning model with information technology will be able to construct new experiences of students through simulation and exploration of initial knowledge through various applications. Educators and students must build a paradigm of thinking outside the classroom [3].

Cybergogy is a learning model that creates a conducive learning atmosphere to generate innovation, generate knowledge and students' emotions by utilizing information technology. This model is supported by the constructivist epistemological social flow, which means that learning is built and internalized through social processes in students [4]. Cybergogy integrates the latest technology in learning that can easily help students independently understand learning materials

through virtual learning [5]. This model is in line with constructivism theory thinking which requires students to be involved intensively in building their knowledge according to their experience and applying it to new conditions [6]. Building knowledge from outside the individual, inside other people, organizations or databases [7]. Rapid technological advances, especially digital content and data communication, have given birth to various applications and media that the public can use to communicate and transact data. This development positively impacts the cybergogy learning model that allows interactive learning in cyberspace, especially problem-based learning, positively impacts virtual learning [8].

This study examines the effectiveness of the application-assisted Cybergogy learning model in the Database Design course in improving student learning outcomes. In previous studies, students' activeness in the cybergogy model of the learning process affects learning outcomes [9]. Subsequent research that online learning can improve learners' cognitive, social, and affective aspects [10]. The database design course is one of the core courses in the informatics science cluster, which forms the basis for other classes closely related to informatics graduates' competence and expertise. Based on initial observations, students are less motivated in attending Database Design lectures. It impacts a low level of coursework, low student attendance, and a less interactive lecture atmosphere. Lectures take place online through a teleconference application accompanied by sending lecture materials to student emails. Until the implementation of the midterm exam, it can be seen that the student scores consisting of 125 students have a low average score. This can be seen in the following table:

Table 1. Mid-semester exam value for class a, b, c, d course of data base design in information systems program – stmik methodist binjai 2019/2020

Number of Students	Mid-Semester Grades		
	Midterm Value >=70	Midterm Value < 70	Not Following Midterm
125	45 (36%)	65 (52%)	15 (12%)

From the table I above, it can be seen that 125 students from class A who took the Mid-Semester Examination for Database Design courses, only 45 (36%) students understood and mastered the Database Design material, as many as 65 (52%) students did not have a good understanding about lecture materials and others as many as 15 (12%) students did not take the midterm exam.

The low test scores of 80 students are assumed to be the impact of the learning model that still applies teacher centre learning even though it is already using video conference media due to the ongoing COVID-19 pandemic. According to [11], the teacher centre learning model can quickly cause learning boredom to the difficulty of learners to evaluate the level of learning outcomes due to attachment to material completion. To overcome these problems, it is necessary to combine learning models that can provide a stimulus for students to be motivated and think creatively. The learning model in question is the application-assisted Cybergogy Model. Cybergogy is a structured learning model designed by collaborating the concepts of pedagogy and andragogy [12]. The learning process is centred on the learner who can encourage independence in collaborative situations using and utilizing online learning resources.

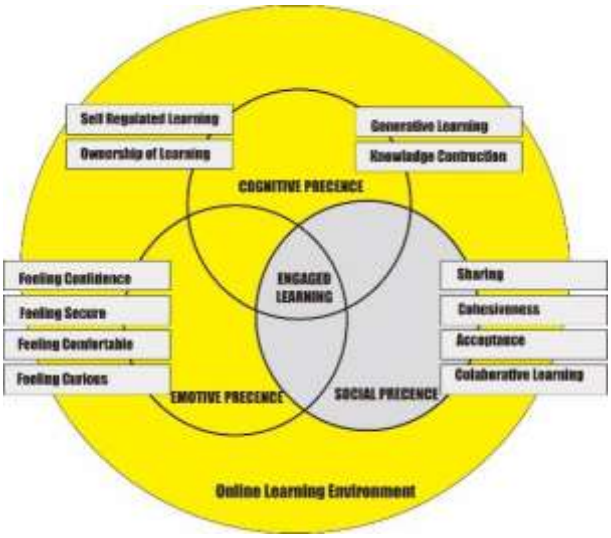


Figure 1. Cybergogy Models [13]

The cybergogy model concerns three main aspects of learning: cognitive, emotional, and social aspects that can help improve students' cognitive, emotional, and social abilities towards learning needs and skills [13]. This model is built in an online platform application in which there is a learning simulation to be able to improve cognitive, social and emotional intelligence, as shown in Figure 1. From the cognitive dimension, the cybergogy model is closely related to the social life of students so that it greatly affects personal abilities and emotional factors of engagement. All the senses both consciously and unconsciously [14]. To achieve a good cybergogy learning goal, it takes broad-minded

students' character, has a high level of motivation, and establishes good relationships with elements and the learning process [13]. Another thing that must be considered during the cybergogy modelling learning process is that the learner must be in a comfortable learning environment with high social characteristics and a strong desire to get results from the learning process he is following [12].

2. METHODE

The research carried out was using a quasi-experimental quantitative research method using a nonequivalent control design by designing experimental and control groups. The Quasi Experiment method is based on the difficulty in forming the control class used in the study [15]. The experimental group or group was given the application-assisted cybergogy model treatment, while the control group used a conventional learning model. The following is a quasi-experimental research design chart:

Table 2. Research Design

Class	Pretest	Treatment	Posttest
Experiment	Q1	X1	Q2
Control	Q1		YQ2

Information :
Q1 = Observation before being given treatment
Q2 = Observation after being given treatment
X = Application-assisted cybergogy model treatment

The population in this study used all students who took database design courses in the third semester of the 2019/2020 academic year, namely, 125 students. A homogeneity test was conducted to obtain potential candidates for the experimental and control classes and ensure that the measured data came from a homogeneous population. Of the 4 population classes, samples were taken using the random sampling technique. The random sampling technique is an approach to collecting data for research to obtain an unbiased example and represent a group or population [16]. To fill the experimental and control classes, class A consisted of 32 students as the practical class and class B as many as 32 students as the control class. Measurements were made by obtaining data from the initial value of learning (pretest) with the final value of learning (posttest) in both types of classes.

4. RESEARCH RESULT AND DISCUSION

Implementing learning in the experimental and control classes still uses the semester lesson plan (RPS) with the same sub-discussions by the same caregiver lecturer. In the control class, online learning takes place using teleconference media, lecturers' delivery of lecture materials is conducted virtually, and the delivery of lecture material files and lecture assignments via email to each student. In the experimental class, the same thing applies, namely the delivery of lecture material by the lecturer through teleconference media. Still, the course material has been provided in an application Learning Management System (LMS) designed in this study. Learning Management System is an online-based software that is integrated with elements and features to carry out the activities of sending and managing learning or course data [17].

The content of the designed LMS contains lecture material features consisting of documents and video tutorials, practise questions and assessment components, discussion rooms and application user assistance features.

Figure 2 Cybergogy model LMS application dashboard

Figure 3 Lecture material page

On the lecture material page, lecturers can input lecture material data in various supporting files. Students can then access the uploaded lecture material for further study. The material contained in the application also provides external links to certain

pages that explain the same material so that students can easily explore lecture material resources.

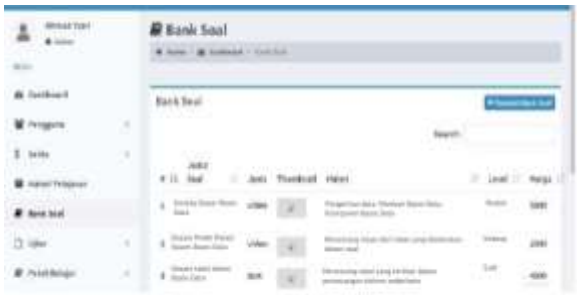


Figure 4. Practice question bank page

As shown in figure 4. the question bank page contains the features of Question Title, Type, Thumbnail, Question Material, Level as information for students to solve problems according to the easiest level. To facilitate the learning process of the cybergogy model, the learning steps are as follows:

Table 3. Learning activities in the application assisted cybergogy model

Kegiatan Pembelajaran			
Activity step	Lecturer Activities	Student Activities	Time Allocation
preliminary	1.Greet 2.Provide study and lecture contracts 3.Delivering information related to the relationship of the courses taught to the relevant field 4.Providing the linkage of the system with the predecessor course	1. View 2. Listening 3. Paying attention 4. Take notes 5. confirm	15 Minute
Presentation of Lecture Materials	Refer to the Cybergogy model with the help of the App	Refer to the Cybergogy model with the use of the App	50 Minute
Closing	Refer to the Cybergogy model with the help of the App	*Carrying out Problem Work in the Application*	25 Minute

From the results of the effectiveness testing carried out, based on the results of the control class pre-test of 32 students, the distribution of the frequency distribution was obtained as follows:

Table 4. Frequency distribution of control class data pretest

No	Interval Class	Absolute Frequency	(%)Frequency
1	41-47	5	15%
2	48-54	3	9.37%
3	55-61	9	28%
4	62-68	6	18,75%
5	69-80	3	9.37%

The data in table 4 shows that the highest value concentration in the interval 55-61 is 36%, but the value with a low break between 41-54 is also high at 28%. This indicates that students in the control class are still at low test scores.

T**able 5.** Results of pretest analysis of control class data

No	Value Description	Value
1	Valid Value	32
2	Missing Value	0
3	Mean	60.21349
4	Std. Deviation	12.33936

5	Std. Error of Mean	2.18991
6	Maximum Value	78
7	Minimum Value	42

From table 5, it is found that the average score of 60.21 does not exceed the standard deviation value, so the pretest value of the control class is normal. The value of the Post-test Data carried out in the control class after data processing was carried out, from 32 students, the following scores were obtained:

Table 6. Distribution of posttest frequency of control class data

No	Interval Class	Absolute Frequency	(%)Frequency
1	61-67	4	12,5%
2	68-74	18	56.25%
3	75-81	5	15.62%
4	82-88	2	6.25%
5	89-95	3	9.37%

Table 7. Hasil analisis posttest dari data kelas kontrol

A	Value Description	Value
1	Valid Value	32
2	Missing Value	0
3	Mean	73.1418540
4	Std. Deviation	7.3126118
5	Std. Error of Mean	1.311281
6	Maximum Value	90
7	Minimum Value	65

From tables 6 and 7, it is obtained data on the improvement in the quality of student scores with the largest distribution of values at intervals of 68-74 and the range of value intervals also spread between 61-95, which can be interpreted that the conventional learning process with teleconference media is going well. And the values are normally distributed. After getting the effectiveness test results of the pretest and posttest of the control class, it is necessary to compare the results of the effectiveness test of the experimental class at the beginning of the test (pretest) and the end of the test (post-test). Then the result is obtained as follows:

Table 8. Frequency distribution of experimental class data pretest

No	Interval	Absolute	(%)Frequency
	Class	Frequency	
1	41-47	4	12.5%
2	48-54	2	6.25%
3	55-61	11	34,37%
4	62-68	6	18,75%
5	69-80	3	9.37%

Table 9. Results of pretest analysis of experimental class data

No	Value Description	Value
1	Valid Value	32
2	Missing Value	0
3	Mean	61.12148
4	Std. Deviation	12.12836
5	Std. Error of Mean	2.27821
6	Maximum Value	80
7	Minimum Value	45

The same thing was also found in the experimental class pre-test of 32 students, namely that the test scores were still low centred on the 55-61 interval of 34.37% and if the total percentage of low scores between the 41-61 intervals was 53.12%. After that, a post-test was conducted on the experimental class by first working lectures for 2 months with the Cybergogy Lecture Model assisted by the LMS application. The following is the distribution of the practical class data values:

Table 10. Post-test frequency distribution of experimental class data

No	Interval Class	Absolute Frequency	(%)Frequency
1	61-67	2	6.25%
2	68-74	6	25% 18.75%
3	75-81	12	37.5%
4	82-88	8	25%
5	89-95	4	12.5%

Tabel 11. Hasil Analisis Posttest dari Data Kelas Eksperimen

No	Value Description	Value
1	Valid Value	32
2	Missing Value	0
3	Mean	82.618540

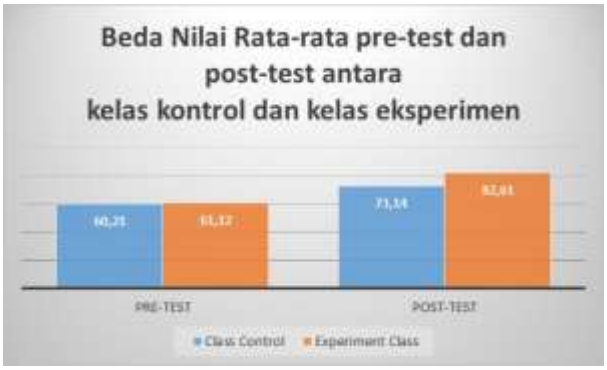
4	Std. Deviation	8.213541
5	Std. Error of Mean	1.474201
6	Maximum Value	95
7	Minimum Value	68

From table 11 above, it is found that the increase in the scores of 32 students in the post-test experimental class, which is concentrated at intervals of 75-81, is 37.5%, and if you add up the percentage of student scores between intervals of 75-95 it is obtained by 75%, this implies that the application-assisted cybergogy model as a learning model that can improve student learning outcomes can be accepted.

Table 12. The results of increasing student learning scores between the control and experiment classes

No	Test Type	Control Class	Experiment Class
1	Pre-test scores	60.21	61.12
2	Post-test scores	73.14	82.61
Gain Score		12.93	21.49

There is a gain score of the average pre-test and post-test between the control class and the experimental class, which is 8.56, meaning that there



is an increase in student test scores and an increase in the number of students who have high scores after using the application-assisted cybergogy model in database design lectures.

Figure 5 Graph of the increase in student learning outcomes

4. CONCLUSION

The application of the application-assisted Cybergogy model in learning effectively improves student learning outcomes in database design courses. There is a significant difference between the scores obtained by students from the results of tests conducted between the control class and the experimental class. This difference can be seen in the average post-test score for the control class, 73.14 and the average value for the practical class, 82.61. There is a gap or difference in the average value increase of 8.56. The application-assisted cybergogy learning model is also able to increase the number of students who get good grades, as seen in the score interval between 68-95, which is 30 students or 93.75% of the total sample in the experimental class when compared to the control class which is only 28 students, this is caused by activeness. Students in using applications that provide interesting discussions, simulations and up to date lecture materials

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