

Implementation of the Case-Based Learning Model Through Online Flipped Classroom Learning Approach in Computer and Society Course

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ABSTRACT

The Computer and Society course at the Information Systems Department, Universitas Andalas, studies ethical, legal, and policy issues society faces caused by technological developments. Learning activities for this course are usually carried out using the traditional lecture method, which is then followed by a question and answer session with students. Another method used is where students are divided into several groups, given topic material to be discussed and present the topics in turn. The two methods above are also used when the lecture process must be carried out online during the Covid-19 pandemic in Indonesia. This learning method focuses on explaining the syllabus and concepts, where the lecturer explains the theory while the students passively listen and write. This makes students lose motivation and cannot learn independently. Application of Case-Based Learning Model through Flipped Classroom Online Learning Approach in Computer and Community Courses gives results where students have achieved the desired target of learning activities. This target can be seen from how students arrive on time to carry out group discussion activities, explain the material, listen to group members' explanations, participate in discussions, demonstrate critical thinking, and are responsible for discussion activities. However, because this activity is carried out online, there are still various obstacles in the implementation process, such as internet network problems, internet data limitations, and device specifications that do not support learning activities.

Keywords: Case-Based Learning, Flipped Classroom, Online Learning.

1. INTRODUCTION

The Computer and Society course at the Department of Information Systems, Universitas Andalas, focuses on some of the ethical, legal, and policy issues facing society in the era of the information revolution. By taking this course, students are expected to understand the concept of using computers and their use in various aspects of people's lives. In addition, the main objective of this course is to expose students to ethical and legal issues that have arisen as a result of the widespread of computing technology, thereby encouraging critical reflection on these issues.

Learning activities for this course were usually carried out using the traditional lecture method followed by a question-and-answer session. This learning method focuses on delivering the syllabus and concepts, where the lecturer explains theoretical knowledge while students passively listen and take notes. Students pay

little attention to problem-solving, collaborative learning, and lifelong learning strategies with this one-way learning method. This makes students lose motivation and can not learn independently.

In addition to this lecture method, another method used is where students form several groups and be given topics of lecture materials. In groups, students study related literature and present the topic in front of the class. The advantage of this method is that students are given the opportunity to explore specific topics. Students will be trained to work together in groups and to present their work in front of the class. However, students tend to only care about the topic of the material that is their task, so the topics from other groups are not well understood.

In the two methods above, learning activities are dominated by activities to discuss theories and concepts related to computers and society. Computer and Society course is a course that deals with the benefits and

problems that occur in society due to technology, so students should discuss more real-world events related to technology in society rather than listening to theories and concepts from lecturers.

The two methods above are also used when the lecture process must be carried out online due to the Covid-19 pandemic in Indonesia. Lectures are conducted using various digital platforms, such as Zoom, Microsoft Teams, and the Learning Management System (LMS) Schoology. The problems that often occur are limited internet quotas, unstable networks, and devices that do not support the digital platform used. As a result, lecture activities cannot run optimally, and lecture materials are not delivered properly.

Flipped Classroom (FC) is a learning method in which what is usually done in the classroom is now replaced with activities that are done outside the classroom, and what is usually done outside the classroom (such as homework, assignments, etc.), is now done in the classroom [1]. FC is one of the mixed learning methodologies intended to increase the effectiveness of classroom learning by enabling learners to control the time and pace of their online learning and maximize their opportunities for active learning by engaging in classroom discussions and collaborative exercises in learning [2]. Several recent studies have also found that compared to traditional lecture-based classrooms, students in FC consistently have greater satisfaction and more positive academic outcomes, motivation, and engagement [3].

According to Jonathan Bergmann and Aaron Sams [1], the learning time will be reconstructed in learning the FC model. Students still need to ask questions related to the material delivered through the video. To answer these questions, the first few minutes are allocated during class meetings. This will allow students to recall the material delivered through the video and as a forum to straighten out perceptions that may be different. Furthermore, the learning time in class will be used to carry out more extensive activities and solve targeted problems.

In the FC model, before class starts, students will learn the material to be discussed, either through videos or other learning resources. At this stage, students are expected to have the ability to remember and understand the learning material. Students are better prepared to apply and analyze subject matter by applying more interactive learning methods when entering the classroom. Furthermore, students can deepen their understanding by evaluating and creating after learning in class.

In traditional learning, lower levels of learning such as remembering and understanding occur in the classroom, while students usually work on activities that

involve higher-level learning outside the classroom. However, in the FC model, the learning is reversed. Learners can complete low-level cognitive work before class. And when they come to class, they can engage in higher levels of cognitive learning with the presence of friends and teachers.

Case-based learning (CBL) is an active learning strategy focusing on the learner as the center of the learning environment. The case-based approach encourages community-based, learner-centered exploration and exploration of a given problem-oriented, realistic and specific situation [4][5]. With CBL learning, students will be involved in independent learning and have more significant opportunities to collaborate with colleagues [5]. In addition, CBL can develop students' critical thinking and integrate theory into practice or real-world cases [5].

In addition, CBL has several advantages [4]. First, in CBL, students are more actively involved in their learning than in the lecture method, where students may be passive, and their attention may be reduced. Second, CBL allows classroom activities focused on application, problem-solving, and communication (i.e., higher levels of learning). In contrast, traditional lectures are focused on delivering content and are not set up for higher levels of learning. Third, CBL allows for feedback on case studies and opportunities to discuss problems with experts in the field, while during lectures, there is little feedback on students' understanding of the learning material.

The importance of reviewing research that other researchers have done is to know the position of this research. The Flipped Classroom Learning Model in Distance Learning increases student learning participation [6] and can be a better choice than traditional lecture-based classes [2]. The results also show that the combined FC-problem-based learning approach is practical and increases students' knowledge [7]. In addition, FC can take advantage of various learning media to expand the reach of education, which will ultimately improve and optimize the learning process, such as learning videos, multimedia technology, virtual classrooms, voice messages, email, remote conferencing, online text animation, and video streaming [8].

By combining the CBL model through an online FC learning approach in the Computer and Society course, it is hoped that the lecture problems that have occurred so far can be resolved. For this reason, the author took the initiative to conduct classroom action research on the implementation of case-based learning models through the online flipped classroom learning approach in computer and society courses.

2. METHODOLOGY

2.1. Research Settings

This classroom action research is conducted online by utilizing the Youtube video sharing platform [9][10], Schoology's Learning Management System (LMS) [11][12], and the online meeting platform Ms.Teams [13]. The research was conducted during the implementation period of the Odd semester courses for the 2021/2022 Academic Year.

2.2. Research Subject

This research was conducted on students who took Computer and Society courses in the odd semester of the 2021/2022 Academic Year. This course is a compulsory subject held every odd semester for students in the third semester of the Department of Information Systems, Faculty of Information Technology, Universitas Andalas.

2.3. Performance Indicators

The performance indicator to be achieved in this study is an increase in student learning activities in the Computer and Society course, which includes the aspects in the following Table 1. This performance indicator is observed during the learning process and is calculated from student participation/contribution during learning activities

Table 1. Performance Indicator

No.	Achievement Indicator	Achievement Target
1	Always present and punctual in group discussions by bringing complete, short, and clear self-task reports	80
2	When discussing, explain the material well, which is the task of the student, and help friends to understand	75
3	Listening to a friend's explanation well and actively trying to understand the material being explained	75
4	Inviting other members to provide feedback, participate in discussions, and keep the discussion on the issues being discussed	70
5	Critically assess the information submitted by friends by asking to check and re-check the results of group assignments	70
6	Happy to take greater responsibility in completing group assignments	70

2.4. Data Sources

Sources of data used in this study are as follows

1. Study of literature.

A literature study was conducted to view and study the relevant literature related to this research. This literature study was carried out before the stage of implementing the Case-Based Learning model through the online Flipped Classroom learning approach.

2. Observation data

Questionnaires were conducted to collect data regarding student activity during the application of the Case-Based Learning model through the online Flipped Classroom learning approach.

2.5. Procedure/ Research Flow

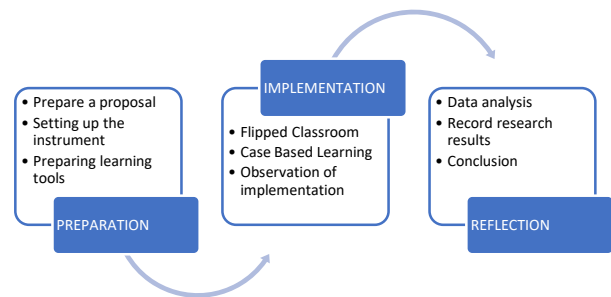


Figure 1. Procedure/ Research Flow

The research flow begins with the preparation stage, namely proposing. At this stage, the researcher conducts a root cause analysis related to the quality of learning in the Computer and Society class. Then, at this stage, the researcher also prepares the research instruments determined and the preparation of the learning tools that will be used.

The next stage is the implementation stage, namely applying the CBL class model by utilizing FC on students who will be the object of research. Here, students will be given a questionnaire and will also be observed for data collection. After the data is collected, the next step is to analyze the data, record the research results and draw conclusions.

Table 2 below describes the framework implemented in this research.

Table 2. Framework Implemented in This Research

Lecturer	Student
A. Before Class	
1. Enroll students to Schoology 2. Prepare videos of lecture materials, then upload them to Youtube 3. Make an assessment in Schoology by uploading the video link and asking questions to review the lecture material on the video	1. Watch videos of lecture materials that have been uploaded to Schoology 2. Answer questions to review the lecture material on the video
B. During Class	
1. Review lecture material on videos that have been given at Schoology 2. Review answers to questions related to lecture material on videos that have been given at Schoology 3. Divide students into several case study discussion groups 4. Guide case study discussions	1. Discussion of lecture material 2. Small group discussion to discuss the given case study
C. After Class	
	Fill out the questionnaire

3. RESEARCH RESULTS AND DISCUSSION

3.1. Characteristics of The Respondents

The implementation of the Case-Based Learning Model through the Flipped Classroom online learning approach is carried out in the JSI-61119 Class C Computer and Society course, consisting of 45 students.

3.2. Class Implementation

3.2.1. Before Class

Before the class, the lecturer created a Computer and Society class in Schoology and distributed the class access code to the students.

Then the lecturer prepared the lecture material by dividing the material into several small parts. These small materials were then recorded using the PowerPoint application, which produced some video files in mp4 format. The videos were then uploaded to YouTube. YouTube was chosen because it can be accessed easily and has features to adjust video quality and speed.

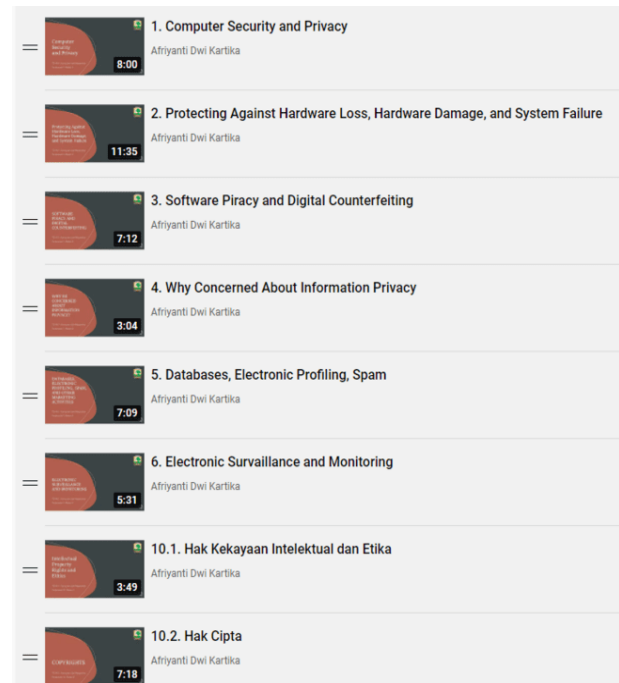


Figure 2. Some Videos Learning Materials That Have Been Uploaded to YouTube

After the material was uploaded to YouTube, the lecturer made an assignment in Schoology, which contained the video accompanied by questions to review the content of the video. In addition, lecturers also used video material from various other sources. In addition, lecturers also used video material from various other sources with good explanation quality to get comprehensive learning materials.

Then, students logged into their respective Schoology accounts to watch videos of learning materials and answered questions to review the learning materials. Students used this activity to watch the video as many times as needed. In addition, students can also set the time and place to access the online materials at any time and anywhere.



Figure 3. Example of Review Results on Learning Videos by Students

3.2.2. During Class

The implementation of online learning was carried out using the *Microsoft Teams* platform. At the beginning of the class, the lecturer reviewed the lecture material in the video given at Schoology and reviewed the answers to questions that students had answered.

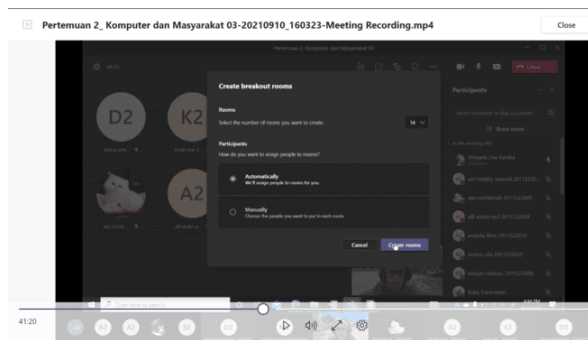


Figure 4. Sharing Discussion Groups Through Microsoft Teams

The lecturer then divided the students into several groups. The lecturer made several questions for case studies where students discussed these questions with their respective groups randomly selected by *Microsoft Teams* platform. With this activity, students were trained to use previously acquired knowledge to solve real-world problems.

Students discussed a given case by using the *Google Jamboard* application. This application allowed students to collaborate online and make presentations on the results of discussions simultaneously and attractively.

At the end of the session, several groups of students presented the results of their group discussions. Other groups also got the opportunity to ask questions and add solutions to the case study.

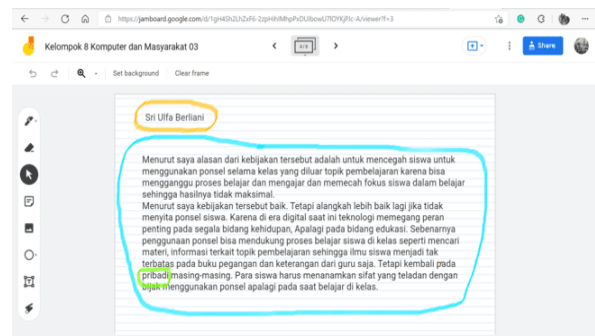


Figure 5. Example of Student Group Discussion Results Through Google Jamboard

Overall, this online activity had been running smoothly. However, there were still some obstacles. First, there were internet network disturbances for some students and sometimes for lecturers, so discussion activities did not go well. This constraint caused muted or invisible screens that were shared during the discussion. Second, this discussion activity used at least two online applications simultaneously, namely *Microsoft Team* and *Google Jamboard*, which consumed a lot of internet data. In addition, there were student devices that did not support this application properly, so that these students could not participate in discussion activities properly. Third, some students had limited access to internet data, so they had to turn off videos when online learning and discussions took place.

3.2.3. After Class

Students were given a questionnaire consisting of six questions based on the indicators in Table 1. Each student assessed each member of their group.

Student activity observation data can be seen from each student's contribution/participation assessment to each student member of the group (Table 1). This data was obtained from the results of the form given to students, which consists of six statements:

- Statement 1: Always present and punctual in group discussions by bringing complete, short, and clear self-task reports
- Statement 2: When discussing, explain the material well, which is the task of the student, and help friends to understand
- Statement 3: Listening to a friend's explanation well and actively trying to understand the material being explained
- Statement 4: Inviting other members to provide feedback, participate in discussions, and keep the discussion on the issues being discussed
- Statement 5: Critically assess the information submitted by friends by asking to check and re-check the results of group assignments
- Statement 6: Happy to take greater responsibility in completing group assignments

Each student gave a score by writing down the appropriate score on a scale of 1-6: None (1); Few (2); Enough (3); Good (4); Excellent (5); and Best (6). From the results of the assessment, data were obtained, as shown in Table 3 below.

Table 3. Student Activity Observation Results

No.	Statement	Target	Average Achievement
1	Statement 1	80	88
2	Statement 2	75	78
3	Statement 3	75	83
4	Statement 4	70	78
5	Statement 5	70	76
6	Statement 6	70	78

From Table 3 above, it can be concluded that implementing the case-based learning model through the online flipped classroom learning approach in Computer and Society course has had a good impact on student learning activities. All assessment results on six statements indicate that they have passed the targeted score.

4. CONCLUSION

The implementation of the Flipped Classroom in this classroom action research utilized the YouTube platform and the Learning Management System, Schoology. The use of YouTube has made it easy for lecturers to share learning videos. In addition, lecturers can also take advantage of learning videos that are available on YouTube for free. Students can also adjust the quality and speed of the video as desired. Then, the use of the learning management system, Schoology, made it easier for lecturers to design student learning activities and see the progress of student learning activities. The learning management system allowed lecturers to be able to guide students to study independently. With the Flipped Classroom approach in this Computer and Society course, students can freely access learning materials anytime and anywhere before the class.

The implementation of case-based learning models was carried out by utilizing Microsoft Teams and also Google Jamboard. Students can use the knowledge they have gained in previous Flipped Classroom activities to solve the case studies given in this activity. The use of Microsoft Teams had made the process of group division and case study discussion easier. Meanwhile, the use of Google Jamboard allowed students to collaborate and make interesting presentations simultaneously.

Implementing the Case-Based Learning Model through the Flipped Classroom Online Learning Approach in the Computer and Community Course gave results where students had achieved the desired target of learning activities. The target was seen from how students are present on time to carry out group discussion activities, explain the material, listen to group members' explanations, participate in discussions, are critical, and are responsible for discussion activities. However, because this activity was carried out online, there were still various obstacles in the implementation process, such as internet network disturbances, internet data limitations, and device specifications that do not support the implementation of learning activities.

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