# Exploring the Use of Flipped Classroom in Influencing Listening Comprehension of Civil Engineering Students

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**Abstract.** Nowadays, maintaining students' listening ability, particularly during this COVID-19 pandemic, is challenging. Listening comprehension is an influential aspect of learning English that is also affected by learning patterns in today's pandemic era. This study elaborates on the influence of using flipped classrooms on the learning motivation of civil engineering students of Politeknik Negeri Ambon. This study aims to determine whether or not the use of flipped classrooms influences students' listening comprehension in learning English. The quasi-experimental design was carried out in this study. The study took two classes in the first semester of TKJJ Study Program in the Civil Engineering Department of Politeknik Negeri Ambon as a sample through cluster random sampling. One class is the experimental group and the other is the control group. The experimental group was taught by implementing flipped classroom, while the control group was taught using the traditional method. The teaching materials used in this study refer to English for Specific Purposes (ESP), namely English for Civil Engineering. The results of the study revealed that the use of flipped classrooms encourages students' listening comprehension, as shown from the data that the t-test value (4.3) was higher than the t-table value (2.000). It means that flipped classroom has influenced and improved students' listening comprehension in the classroom.

Keywords: civil engineering, ESP, flipped classroom, listening

## 1. INTRODUCTION

The learning process requires mental involvement, work, and active participation. It is not just an activity conveying information that has automatic consequences for students. Active learning requires students to do many things that require the use of reasoning power, study ideas, solve problems and apply what they learn. In gaining knowledge, students need to listen, see, ask questions, and discuss it with others. Furthermore, the most important stage in this process is how students describe things in their own way, show examples, try to practice skills, and do tasks that demand the knowledge they have learned.

Lecturers and lecturers are usually expecting learning outcomes in the form of excellent and optimal learning achievements. However, in achieving these learning outcomes, students usually still need help, so their learning achievement is not optimal. Improving student learning outcomes are influenced by many factors, including the students' motivation to learn.

In improving the quality of learning, lecturers need to do various things, one of which is increasing student motivation. In learning, students will be successful if they have the will to learn

and the desire or drive to learn within them because, with an increase in listening comprehension, students will be moved, focused, and enthusiastic about learning. The learning process that motivates students to follow will be enjoyable, especially for lecturers and lecturers. Students who complete a learning task with a feeling of motivation towards the material that has been studied will be more likely to use the material that has been studied.

Various studies have revealed how important students' motivation is in learning. The more attractive the lecturer's learning process, the more motivated students will be to attend the learning process. Research conducted by Prasetya (2013) has revealed a significant difference in learning outcomes between groups of students implementing web-facilitated e-learning and those using traditional methods. This study also states a significant difference in learning outcomes between students with high and low listening comprehension. Sari (2019), in her research, also found that by implementing good learning media, the students will be more interested and motivated in learning English. This study researched the use of updated media to develop students speaking ability and made students feel motivated and interested in learning English. Furthermore, Ulwiyah (2021), in her research, also confirmed that the use of new media in teaching English is very needed. The study aimed to develop students' English in online learning by utilizing various authentic materials in their free time.

In today's fast-paced entertainment and technology world, keeping students motivated to learn is extremely difficult. Easy access to the entertainment-filled Internet often makes students forget or lazy about going to college. However, the existence of online learning methods (e-learning) increases the motivation of students to learn again. In motivating the students to learn, the researcher also applied teaching e-learning. In this study, the researcher used flipped classrooms to overcome the problems faced by students, particularly in this COVID-19 pandemic.

The COVID-19 pandemic has both positive and negative impacts. From the perspective of the education system, the current pandemic demands lecturers and lecturers to continue to be creative in arranging online distance learning so that it remains effective. Online distance learning requires lecturers and lecturers to re-create learning materials, re-create the scoring system, and re-create the learning rules. Therefore, this pandemic has had a good impact on the education system, making it easier for lecturers to implement learning autonomy in online distance learning. In addition, the education system must define new ways of distance learning to remain effective for students and lecturers. In this study, the researcher offers the implementation of a flipped classroom learning model using Google Classroom to encourage students' listening comprehension.

The flipped classroom is a learning strategy that reverses the traditional learning environment by providing learning content outside the classroom. This learning method is the opposite of the traditional method, where the class instructor typically provides materials, and students complete assignments at home. The concept of this learning model, namely, learning activities usually completed in class can now be completed at home, and learning activities usually done at home can now be completed in class. In this present study, the learning material provided by using a flipped classroom will be adjusted to the material in English for specific purposes so that the topics offered are responsive to the needs of students at the polytechnic.

Since the 90s, more and more research and studies have been conducted to measure the effectiveness in the learning process in schools. Many have questioned whether the lecturers should be the center of attention in the classroom and tasked with conveying information through one-way communication. Shouldn't the role of students as recipients of information be more

critical? These questions have prompted many researchers to conduct ongoing studies to find answers to the most effective learning model, flipped classroom touted as the most effective learning model.

The flipped classroom is one of the most widely used learning models in developed countries such as Sweden, the United States, Norway, and many others. What is flipped classroom? As the name suggests, flipped, which means flipping or upside down, and classroom, which means classroom, flipped classroom is a learning model resulting from turning the traditional learning model upside down.

Flipped classroom uses learner-centered instruction, where class time is used to explore learning topics more deeply and create more meaningful learning opportunities for students. Bergmann and Sams (2012) stated in their book that, firstly, students are introduced to new topics outside the classroom. Then in the flipped classroom learning model, "content delivery" can take various forms. Sometimes, the use of media in the form of instructional videos prepared by the lecturer is used to deliver the material.

There are several advantages to implementing flipped classrooms, as follows.

1. It is very suitable for the learning styles of today's students, where students are very close to technology, especially during the COVID-19 pandemic.
2. It helps students have positive activities outside of school.
3. It helps students who want to try to understand the learning material.
4. Increase interaction between students and lecturers.
5. It changes the class management and learning atmosphere.

By implementing an inverted classroom strategy, students learn outside the classroom as well as in the classroom. Students can also repeatedly access material provided by the instructor or browse using the Internet or tutorial videos provided by the instructor. The stages of learning with flipped classrooms for students are learning topics on their own, usually using video lessons made by the instructor or other educators. In the classroom, students try to apply knowledge by solving problems and doing practical work, including group learning (Tucker, 2012). The instructor's role in this class is not to provide initial instruction so that the instructor can spend more time interacting with the students. This interaction role allows classroom time to be used for additional learning-based activities, including differentiated teaching and project-based learning.

Flipped classroom started when two chemistry lecturers, Bergmann and Sams, uploaded a recorded PowerPoint presentation from their class to the Internet for absent students (Bergmann, 2014). Have them watch homeschooling videos before class, have them do their homework, and when they come to class, the teacher will give them the necessary explanations about the difficult points. A similar attempt was made when Salman Khan recorded numerous micro speeches on various subjects such as mathematics, physics, biology, economics, and finance. We built an academic website named Khan Academy to teach different subjects with self-assessment tools and a means of tracking student progress.

Since then, the flipped classroom has become a widely used teaching model and has attracted the attention of many researchers and educators. The flipped classroom changes the regular teaching order compared to a traditional classroom. Give students homework to explain the lesson and highlight the information provided, then practice the lesson. Instead, the flipped classroom instructor makes educational videos and other resources available to students on the Internet for self-study. During class, students and faculty engage in various activities that illustrate students' challenges in independent learning. Some researchers argue that instructional videos are

not a key component of flipped classrooms but instead focus on changing educational processes and active, student-centered, project-based learning.

Flipped classroom requires students to gather information before class. Instead of presenting information to students, lecturers guide them and use class time to make learning meaningful (Lo and Hew, 2017). Delivery times for content presentation and concept and skill practice are reversed. Technological advances make it easier for lecturers to deliver material to students before class time, which allows dedicating class time to more interesting activities.

Some previous researchers found that the flipped classroom was effective, giving students time to complete daily assignments and activities and, at the end of class, to complete the next day's video lessons. Johnson (2013) ) was concerned that students would be less active in developing this flipped classroom and seek instruction in a traditional classroom. Students report the benefit of watching videos at times that suit their schedules and study needs. I also love videos that you can pause, repeat, and resume once you understand the concept. This result is significant. Because it shows that instructional videos can be an effective alternative to traditional lectures in education, this data shows how students perceive their efforts.

Some studies already elaborate on the advantages of using flipped classrooms in teaching English. Wulandari (2017) found that implementing flipped classroom learning brought positive perceptions from students towards its uses in fostering the students' autonomy in learning language. In addition, Hamciuc and Roux (2014) stated that the use of flipped classrooms allows flexibility for students who need extra time or work at a different pace. Furthermore, Mas'ud and Surjono (2018) proved that the flipped classroom learning model with Moodle as a learning medium positively influences the students' higher-order thinking skill learning based on their learning outcome.

Based on the previous studies above, the flipped classroom model is suitable for classroom application. This study suggests that the flipped classroom can influence students' listening comprehension, especially their motivation to learn English for Civil Engineering in the polytechnic. The curriculum used in polytechnic is way different from that used in universities in general. Therefore, English for Specific Purposes (ESP) is the learning material. This different context of the curriculum in the polytechnic distinguishes this present study from previous studies. Based on preliminary observations conducted in class, students feel they need more motivation to learn English. The lack of motivation is evidenced by their test scores which tend to be less than after they used the flipped classroom method.

## 2. METHOD

This present study applied a quasi-experimental design, which is done to measure the effect of a treatment (Cook, 2015). This study was conducted on first-semester road and bridge construction engineering (TKJJ) students in the even semester of the 2021/2022 academic year. The sample in this study was taken using the Cluster Random Sampling technique using a lottery. The research samples obtained were students of class TKJJ 1A and class TKJJ 1B. The total number of samples is 53 students. The experimental class was class VIII-C, consisting of 27 students and the control class was class VIII-E, consisting of 26 students. Data collection techniques were (1) a written test, used to determine student learning outcomes in terms of cognitive, (2) observations, used to determine student activities, (3) the questionnaire, used to determine the category of student learning independence.

The data collection procedure was performed in three steps: pretest, treatment, and post-test. The purpose of the pretest was to know and confirm the students' prior knowledge of their English writing skills before treatment. The pretest is a listening test consisting of correct/incorrect sentences (5 items), synonym matching (10 items), and fill-in-the-blanks (15 items). Treatment was given in 4 sessions. Each meeting lasted 2 x 50 minutes. At each conference, explanatory texts were used as a source of teaching and learning processes on various subjects. After treatment, a post-test was given to determine the instruction's outcome and the students were treated. Presents significant differences in student improvement before and after using a flipped classroom.

The means of investigation was a hearing test. The experimental class consists of multiple choices (15 items) and blanks (5 items). The control class had several choices to fill the space (15 items). A pretest was designed to assess students' listening comprehension after treatment. The content of the pretest was the same as the post-test.

The lecturer carried out this procedure in teaching English using the flipped classroom approach. First, if the material is a video, the lecturer must ensure that software such as Windows Movie Maker or the like has been installed on his computer. Second, the lecturer will then write a script to be read from the beginning of the video to the end. The script's contents can adjust the theme/topic to be taught. Third, the lecturer then prepares the material to be displayed in the video. It can be pictures, clips, instrumental music, words, quotes, and other format of materials. Those materials support the narrative.

The next step is that the lecturer, who acted as the narrator, recorded his voice while reading the script. When the recording was complete, he transferred the sound and all supporting materials to a video format. The lecturer must arrange everything in the proper order and sequence so the video will be interactive and interesting for students. When ready, the material in the video can be uploaded on social media such as Youtube, Instagram, Facebook, Whatsapp, or others, and then students are asked to download it.

The lecturer then asked the students to watch the video, learn and understand it as fully as possible. After that, the lecturer asks students to form groups of two or three students to discuss the material provided with the guidance of the lecturer as their facilitator. Each group was then asked to write down the results of their discussion. After that, they presented the discussion results in front of the class.

The lecturer will respond to students' problems and presentations in an accommodative and interactive manner between discussions, writing, and presentations. With interesting and creative activities and responsive lecturers, the class was lively and comfortable, so students did not hesitate to speak English a lot. As a result, if it goes well, the student's English skills, speaking, writing, reading, and listening, will be honed and will eventually improve significantly.

## 3. RESULT

A t-test was performed to see if there was a significant difference in the students' mean listening scores for buffer among the students in the experimental class, namely students taught by the flipped classroom learning model, and control class students, namely students taught by the direct learning model. The average student learning outcomes of the experimental and control classes are presented in Table 1.

*Table 1. Significance t-test 0,000 < α (0,05)*

| Data | Value |
|---|---|

| | |
|---|---|
| The average student learning outcomes of the experimental class | 83,72 |
| The average student learning outcomes of the experimental class | 76,44 |

The table above shows the significant difference in average learning outcomes between students in the experimental class and those in the control class. Students' learning outcomes are higher in the experimental class than in the control class. These results indicate that the flipped classroom learning model positively affects student learning outcomes regarding buffer solutions.

In this study, learning activities are carried out in groups divided into eight groups, each with five heterogeneous students. This group is formed before the teaching and learning process takes place. Before face-to-face, students are asked to study independently at home regarding material for the next meeting by watching a learning video. The initial activity will convey apperception, motivation, and learning objectives.

The role of the lecturer during the learning activity is to facilitate it. In addition, the lecturer will also prepare several questions (questions) from the material. The lecturer prepared several questions about today's topic. The lecturer also asked students to discuss and answer questions about technical English. After this, the instructor gave each group member a listening English test to assess the student's understanding of the material presented. The instructor guides students to reason about the outcomes of learning achieved. Lecturers give awards to the best groups and most active students in class.

Below is an example of engineering English learning material uploaded on the learning Moodle blog as flipped classroom learning and ready to be downloaded, studied, and given feedback by students.

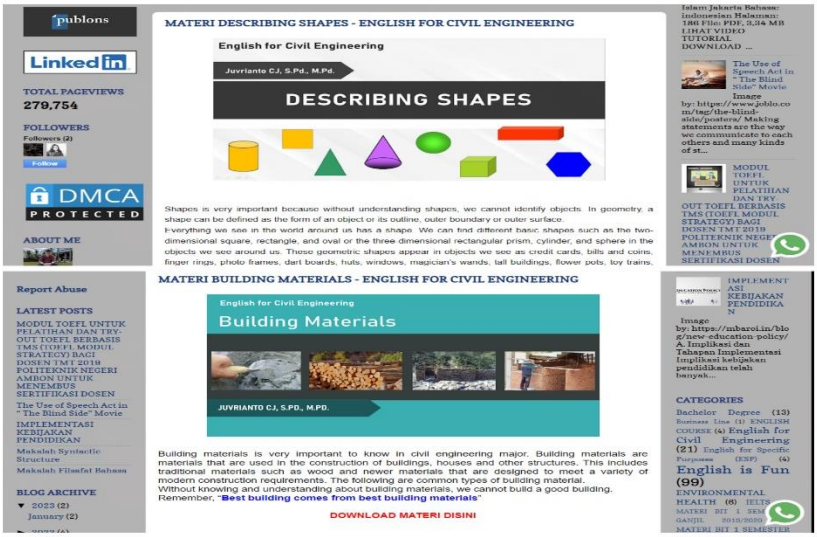


Figure 1. The screenshot of the learning Moodle blog

The development of the Flipped Classroom learning model is a series of processes or activities carried out to produce a flipped classroom learning model based on development theory. The purpose of developing this learning model is so that students can study at home before class starts, and this learning model can be related to the current approach to vocational education (ESP).

Students can not only study via laptops or PCs at home, but they can also learn through their smartphones wherever they are while still being reached by the internet network.

The flipped classroom learning model form uses Moodle, developed to improve students' listening skills, as an application that can facilitate students' learning needs individually or in groups. Research that produces a flipped classroom learning model that uses Moodle is valid, practical, and effective for teaching and learning activities at home or on campus.

It is highly recommended that educators implementing learning can use the Flipped Classroom learning model as an alternative that can streamline relatively little face-to-face learning time and help improve results learn students. This research is still limited to one subject. It is suggested to be able to develop in the course other. This learning model should use a larger hosting capacity to create more material and remain stable in accessing web pages.

Based on the data obtained, using the flipped classroom learning model during a pandemic like now, which requires students to stay home, is an alternative for lecturers. Lecturers who previously gave assignments and homework after giving lessons to students in class now have to change to the opposite. Furthermore, if they are used to this flipped classroom, students will feel comfortable because they are not burdened with assignments after learning.

If, in the traditional method, the lecturer becomes the center of attention during learning and only conveys information or material in one direction with many students as students, students are usually only allowed to ask questions after the end of the study session and give assignments or 'homework' to do at home. The flipped classroom offers more active classroom conditions, where students are required to be actively involved in the learning process, the lecturer provides opportunities for students to express opinions or questions during the learning process, and the lecturer's role is not to be the center of the class but someone who is on the side of the class and guide students to learn together actively.

This phenomenon is possible because, in the experimental class, students can prepare and study the materials and supporting references given so that when in class, students practice more on application questions from the material that has been taught. At the same time, students in the control class, where learning is still centered on the lecturer, make students dependent on what is explained by the lecturer. This student's dependency on the lecturer is in line with the results of observations where students in the experimental class are more active and independent by doing exercises at home and trying to find references related to the subject matter. In contrast, in the control class, students only get an explanation from the lecturer, so students need more time to practice and understand the material. The results of this study are relevant to the research conducted by Olakanmi (2017), which proved that the flipped classroom affected student chemistry learning outcomes and Nurul (2017), who reported that the flipped classroom learning strategy using the *Kelase e-learning* affected student learning outcomes.

## 4. CONCLUSION

Based on the result of the present study, teaching English to civil engineering students using flipped classroom method can develop students' listening comprehension. When verified by the results of the significance level ($\alpha = 0.05$) of the pretest and post-test, the post-test was higher than the pretest. Based on our findings, we can make suggestions for improving the quality of learning in the classroom using flipped teaching. The results show that those who learn with the Flipped learning model Classroom in the English for Civil Engineering course obtained significantly better

learning outcomes than students who used conventional learning. Therefore, the author suggests to lecturers that the Flipped classroom learning model can be a good alternative learning media.

In this study, the superior value of the flipped classroom is that students can learn according to their abilities and abilities, student involvement in the learning process, and understand concepts that students more readily accept, lecturers can also see more clearly which students need more attention or help to pursue behind. The flipped classroom can be an interesting alternative approach for English lecturers in teaching. The word "alternative" is because this approach cannot be carried out continuously for one semester or a year. If it is like that, students will feel bored and "pressured" with many assignments, whether they have to learn at home or discussions and presentations in class.

One of the main benefits of the flipped classroom method is that it gives students more responsibility for their learning. Outside the classroom, students can learn independently according to their abilities so that knowledge can be absorbed. You can set the time and place that is most convenient for you to study. You can also review any materials you still need to understand. Learning is, therefore, more student-centered (student-centered learning). In addition, flipped classrooms allow lecturers to dedicate more class time to engaging and interactive learning activities or more hands-on projects.

In practice, the lecturer can provide some learning materials at home to students, such as assigning them to watch specific learning videos at the Learning House, Educational TV, or YouTube channel. It can be in multiple places. The important thing is that the lecturer's goal of giving assignments is achieved. Besides that, the lecturer can also assign students to look for particular material from recommended blogs. Alternatively, the simplest way is that the lecturer can provide exercises using the Google Form, in which the link is shared via the WhatsApp Group. Thus, when students have done the assignment, the lecturer already has an initial report on the results given to students. So that when there are face-to-face forums both in person and online, the discussion can focus on agreed topics.

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