



Flipped Learning: Asynchronous and Synchronous Models in Online Class to Improve the Learning Outcomes

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Abstract

Flipped learning is a strategy for assisting the online learning process. This study attempts to adopt it in an online class using a quasi-experimental design with a post-test-only control to examine its effects on student learning outcomes. Data was obtained from reading tests administered to students enrolled in the fifth semester of the English Education Department at IAIN (State Islamic Institute) of Palopo. This study discovered at least three findings suggesting that flipped learning improves student learning outcomes significantly. First, students' mean score in the experimental class is higher ($x = 70.11$) than in the control class ($x = 58.70$). Second, the significance value (Sig. 2-tailed) is $0.000 < 0.05$, indicating a significant effect of the experimental class implementation of flipped learning. Third, the effect size is 1.106 with an influence percentage of 86 percent which categorized has a large effect based on Cohen's criteria. The author proposes utilizing a flipped learning technique as a substitute for online learning in light of the findings.

Keywords: Flipped Learning, Learning outcomes, Online Learning

Introduction

Numerous living arrangements had changed with the appearance of covid 19 in Indonesia at the beginning of 2020 when it became an endemic illness. One of the areas the author focuses on and is still struggling with is education, which is crucial for debate because the author is a lecturer and researcher actively working. To

address this issue, the Indonesian government enacted many new regulations concerning education implementation. Since the virus reached epidemic levels, numerous schools have embraced home-based learning to prevent the spread of the pandemic (Supratiwi et al., 2021). Additionally, significant changes to the educational system, such as eliminating the National Examination at all levels and using an online system to admit new students, have altered the face of education significantly. Also, higher education institutions are being compelled to adjust to the current situation by moving the learning process away from offline classes and toward online classes (Almaiah et al., 2020).

Within a few months, there seemed a significant increase in the implementation of an e-learning system as a kind of educational acceleration (Napitupulu, 2020). The concept of Kampus Merdeka (freedom to learn), as envisioned by Minister of Education Nadiem Makariem, was much more swiftly implemented. The most effective method of facilitating the learning process is using E-learning as the medium of instruction during online learning (Andujar, 2020). Numerous e-learning systems, such as Ruang Guru and Google Classroom, and numerous video conferencing applications, such as Zoom and Google Meet, all contribute significantly to online learning (Bond, 2020).

However, several prior research discovered a number of barriers to online learning. Several fundamental problems include facility unpreparedness (Hermanto, 2020) and lack of supporting resources such as computers and smartphones (Padmo et al., 2021). Also, students said that distance learning was ineffective since there was little interaction between classmates and lecturers (Aini, 2020). Students must study independently in order to learn online, but not all students are motivated to do so (Al-Balas et al., 2020). They believe they are not participating in both cognitive and social learning (Jeffrey and colleagues, 2014). Furthermore, poor internet connection and limited Internet data packages are common hurdles faced by students, particularly those who live in places with limited Internet access (K. Wang & Zhu, 2019). This problem has driven lecturers to identify the best way to teach using online platforms, in addition to students (Farooq et al., 2020)

Preliminary observations at IAIN of Palopo revealed that many students were unsatisfied with online learning. Students expressed dissatisfaction with the absence of interaction between students and lecturers. As a result, adaptation took time, resulting in delays in the learning process. Most lecturers statically gave the learning material, indicating that the learning process was not participatory. Typically, lecturers did not conduct video conferences and instead communicated with students via written materials, voice messages, or video explanations. Students who remain perplexed about the material find it difficult to ask the lecturer. They felt they were not a part of the learning process because the lecturer simply assigned tasks that were not clearly defined.

Flipped learning is one of the learning methods that can be utilized to encourage student engagement. It is a type of blended learning that combines

synchronous and asynchronous learning activities (G. Lee & Wallace, 2017). The asynchronous is a mode of learning in which online communication occurs indirectly, whereas the synchronous occurs directly and in "real-time." This model incorporates digital technology inside and outside the classroom (Fisher & Birdthistle, 2018). Typical classroom activities such as explaining the material, giving assignments, exercises, and homework are transferred to online learning (Huang et al., 2018). Presentation of the material before the class meeting provides students with initial knowledge that enables them to study in a novel manner and take responsibility for their learning (Javier et al., 2020). Technology provides students with additional learning assistance materials and vocabulary set to practice that can be accessed online and frees up previously used study time in classrooms (Johnson, 2013). By incorporating technology into the classroom, students' digital competency is enhanced, higher-order thinking skills are improved, and students have access to teaching materials regardless of time or location (Chang & Hwang, 2018).

According to Bishop et al. (2013), flipped learning is a student-centered approach model that reverses the traditional classroom, involving giving students knowledge outside of the classroom that teachers in schools typically delivered through lectures or teacher explanations. Outside of class, teachers deliver fundamental instruction via video or written materials that enable students to make the best use of time.

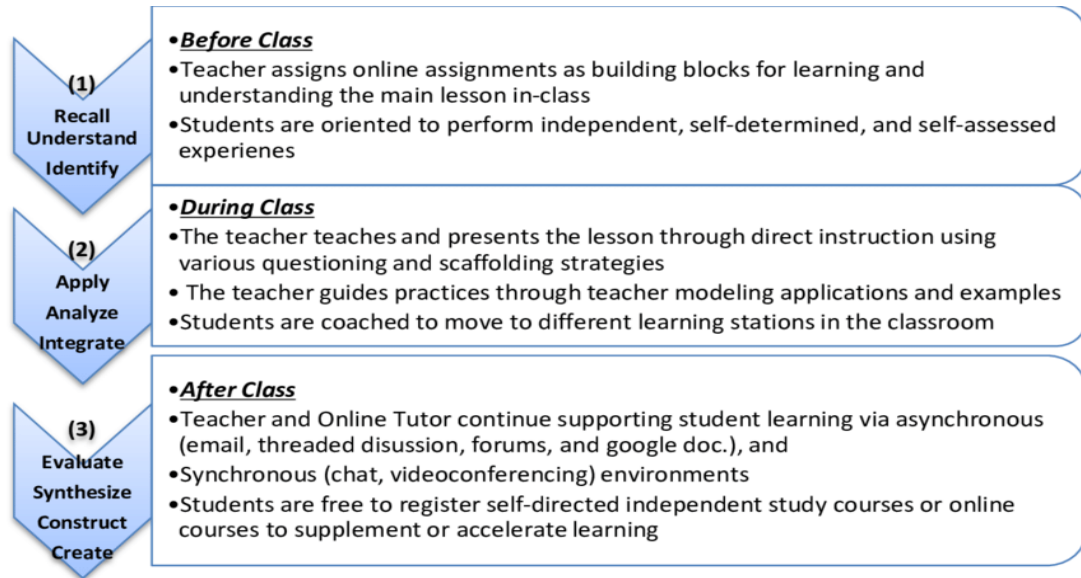
As a result of the preceding description, *flipped learning* can be defined as a learning model that combines synchronous and asynchronous classes. Synchronous Online Learning is a technique of instruction that takes advantage of the internet network by utilizing an application that allows teachers and students to connect in real-time. For instance, the teacher delivers instruction via Zoom Meeting. According to the time frame determined, all students participate in the learning activities conducted by the teacher during the zoom meeting. Meanwhile, asynchronous online learning occurs over an internet network and through applications. Using this approach, teachers and students communicate at different times, showing that a communication gap occurs between teachers and students. For instance, the teacher may use the Google Classroom platform to upload materials or tasks that students must complete within a specified time.

Glassmeyer, Dibbs, and Jenson (2011) discovered that students prefer synchronous over asynchronous online discussions when it comes to online learning. On the other side, Hollenbeck (2011) found that students prefer asynchronous learning since it allows more spontaneous communication. Another study discovered that students dislike asynchronous online classes because professors do not provide sufficient instructions on participating in discussions (Offir et al., 2008). According to previous research, planning and preparation are critical variables in determining whether to utilize synchronous or asynchronous classes in online learning.

According to previous research and observations, the flipped learning

strategy integrates synchronous and asynchronous classes in online learning to enable students to manage their learning while remaining under the teacher's supervision. This learning strategy is very effective because students enter class with an overview of their prior knowledge.

Figure 1: Three phases of Flipped Learning Model



Three phases of the implementation of flipped learning as followed:

1. Asynchronous pre-class activities include studying the subject via videos, written materials, and class implementation instructions. At this stage, the lecturer uploads all course materials to a mutually agreed-upon platform, such as Google Classroom, Moodle, or a Whatsapp Group. The students then study the uploaded materials and carefully follow the Class implementation instructions. The material can be read repeatedly or supplemented with references from other sources until students understand it. Students make notes on important aspects discussed in class and material that has been misunderstood.
2. Class activities are conducted synchronously via video conferences such as zoom or google meet, allowing students and professors to interact virtually. The teacher's first step is to assess students' understanding of the material delivered. Students are then grouped into virtual rooms to conduct discussions under the lecturer's supervision. Additional activities include role-playing, question and answer sessions, and quizzes. The lecturer provides direct feedback to students with difficulty and solves any misunderstandings.
3. At the end of the lecture, asynchronous activities are carried out using the remaining learning time. As a result of their reflection and response to the material taught, students are directed to make summaries in writing and learning videos (learning products). This practice teaches students to think in higher-order (higher-order thinking abilities) and checks for student comprehension.

The results are submitted as student work to the agreed-upon platform, such as Google Classroom, Flipgrid, or Moodle. The teacher re-examines this learning product and provides comments in writing or video to improve student learning outcomes.

The researcher proposes a solution to this problem by implementing flipped learning, which is projected to improve student learning outcomes during the learning process at IAIN of Palopo.

Method

This is a quasi-experimental research with a Post-Test Only Design. It used two groups, experiment and control classes. The experiment class comprises students taught in a flipped learning approach, whereas the control class consists of students taught traditionally. Both classes were given a pre-and post-test to measure the effectiveness of the flipped learning implementation. This research was conducted at IAIN of Palopo in the English Study Program in Jl. Agatis District, Wara Ex. Balandai City of Palopo. The population for this study was English majors in the fifth semester at IAIN of Palopo, which consisted of five classes with 148 students. The sample was drawn from classes C and D, each containing 34 students. However, the sample size was limited to seventeen (17) samples per class due to the epidemic era. This was done using random sampling because the distribution of students was homogeneous, with both high and low academic levels balanced in each class.

The difference between post-test mean scores of the experiment and control classes was compared to determine whether there was a significant effect of the flipped classroom on learning outcomes. SPSS was used to analyze the pre-and post-test data utilizing specified t-test analysis. The findings of this t-test were utilized to determine whether flipped learning helped enhance learning outcomes for English education students at IAIN of Palopo.

Result

The Descriptive Statistics Analysis

The following table 4.1 illustrates the descriptive analysis, which contains the number of data, the maximum and minimum scores, the mean score, and the standard deviation:

Table 1 : Descriptive Statistics Analysis

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Post-Test Control Class	17	42	84	58.7059	12.20535
Post-Test Experiment Class	17	50	90	70.1111	10.18585

Concerning the post-test minimum scores, the experiment class had a higher

score (50) than the control class (42). Additionally, maximum scores of the experiment class (90) are higher than those of the control class (84). Additionally, there was a significant difference in the mean scores of the two classes. The control class has a mean score of 58.7, while the experiment class has a mean score of more than 70.

Moreover, the standard deviation of the experimental class is lower than that of the control class. Thus, all descriptive analyses suggested that the learning outcomes with flipped learning in the experiment class are higher than those obtained in the control class. Thus, all descriptive analyses indicated that the learning outcomes with flipped learning in the experiment class are higher than those obtained in the control class.

Normality Test

In statistics, normality tests are used to assess whether a data set is normally distributed and to calculate the normal distribution of the random variables that underly it. Table 2 shows the results of post-test normality:

Table 2 : The normality test results on the experiment and control classes

Normality Tests

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Post-Test Control Class	.106	17	.200*	.953	17	.511
Post-Test Experiment Class	.119	17	.200*	.954	17	.524

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 2 illustrates the significance value (Sig.) achieved in the experiment and control classes. The Kolmogorov-Smirnov and Shapiro Wilk tests get scores of 0.200 for every data. When the significance value is higher than 0.05, the null hypothesis is accepted, and the data is said to be normally distributed . It can be concluded that the research data of the experiment and control classes are normally distributed.

Homogeneity Test

Homogeneity tests are undertaken to examine if two or more populations or subgroups represent the same distribution or population variance for a categorical variable (Flores, homogeneity). Table 3 summarizes the results of the homogeneity test:

Table 3. Homogeneity Test

Homogeneity Test of Variance

		Levene Statistic	df1	df2	Sig.
Student learning outcomes	Based on Mean	.413	1	33	.525
	Based on Median	.468	1	33	.499
	Based on Median and with adjusted df	.468	1	32.324	.499
	Based on trimmed mean	.411	1	33	.526

Table 4.3 shows the Significance value (Sig.) based on the trimmed mean. The significance value (Sig.) is 0.526 > 0.05 based on the trimmed mean. When the significance value exceeds 0.05, it suggests that the post-test data variance between the experiment and control classes is the same or homogeneous.

Paired Sample T-Test

If the data obtained is distributed normally and homogeneously, the next step is to test the research hypothesis to determine the effect of the flipped learning approach based on repeated instructions and direct feedback on student learning outcomes. The following table 4.4 shows the results of the t-test used in this study:

Table 4.5 The results of paired sample t-test

Paired Samples Test

Paired Differences					t	df	Sig. (2-tailed)
Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
	n		Lower	Upper			

Pair 1 Post-Test								
Experiment Class	-							
Post-Test	11.4052	7.99428	1.88427	-17.41991	-9.46898	-7.135	17	.000
Control Class								

The Significance Value (Sig. 2-tailed) is 0.000 0.05 based on the output in Table 4.5. Suppose the significance value is less than 0.05. In that case, there is a significant difference between learning outcomes in the experiment and control classes, suggesting a considerable effect on the use of flipped learning in the experiment class.

Effect Size Test

After getting the results of the t-test, the effect size test is conducted to determine the effect of flipped learning on student learning outcomes. The extent of the difference between groups is referred to as the effect size (Sullivan, 2012). The absolute effect size is defined as the difference in average, or mean, outcomes between two distinct intervention groups. The following is Cohen's formula to determine the effect of the flipped classroom on student learning outcomes:

$$ds = t0 \frac{\sqrt{nA+nB}}{nA+nB}$$

Note:

ds = the effect of the treatment given

nA = number of samples in the control class

nB = number of samples of the experiment class

t0 = t-test result

$$= \frac{2.99\sqrt{17+17}}{17.17}$$

$$= \frac{2.99\sqrt{34}}{238}$$

$$= 2.99\sqrt{0.14}$$

$$= 2.99 \times 0.37$$

$$= 1.1063$$

The results shows that the effect size of flipped learning is 1.1063. The following is Cohen's guidelines for determining the magnitude of the effect size:

- 0 < d < 2 Low Effect
- 0.2 < d < 0.8 Medium Effect
- d > 0.8 High effect

According to Cohen's criteria, the use of flipped learning in experiment classes and its effect is classified as high (1.1063). This suggests that the flipped learning technique affects a variety of criteria, including those with a high influence percentage of 86 percent.

Discussion

Students appeared to be more engaged during the learning process, and there were no substantial obstacles during the implementation of flipped learning in the experiment class. They are essentially prepared to learn because they have extended time to study independently. On the other hand, students in the control class were not allowed to review the material before the meeting. However, they were required to do so immediately, prolonging the process of delivering material and class instructions.

As a result of the findings, it can be concluded that flipped learning enables students to study independently at home and to repeat the material until they understand. They are more accountable for what they learn at home, preparing them for when they enter the synchronous class. Additionally, they enter class with prior knowledge and can ask questions and receive explanations from the teacher. It is in line with Fisher & Birdthistle (2018), who discovered that flipped learning positively affected students' perceptions and satisfaction. According to Birgili et al. (2021), another advantage of flipped learning is that it provides opportunities for students to learn outside of class meetings, encourages more productive interactions between lecturers and students, and enables students to develop at their own pace (Huang et al., 2018).

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It reveals that classes that apply a flipped learning strategy have a more effective learning process and outcomes than those not using it. The following are numerous benefits to flipped learning:

1. Time efficiency. With the material given before the start of the lecture, it is apparent that time efficiency will occur. Whatever form of media is employed, whether it is audiovisual through an application accessible via students' smart phones or a complete module equipped with exercises and advanced reference recommendations, the goal is to streamline the learning process.
2. The scope of exploration and elaboration can be widened and deepened. This is because the teacher is no longer required to introduce the material, a sort of lead-in to the primary material. Teachers and students will have more opportunities

to discuss substantive issues or even broaden the scope of the material.

3. The learning process is more engaging. This is inextricably linked to the usage of various learning media, such as video or digital apps. Students will gain tremendous encouragement for the learning process by absorbing the given material.

The use of technology in the flipped learning approach encourages students to develop and employ digital literacy skills to understand the material thoroughly, solve problems, complete assignments, post comments, and be proficient with digital tools. Bormann (2014) asserts that when teachers incorporate various strategies and media into the classroom, students become more involved and active participants in the learning process and better learners. Additionally, Bond (2020) indicates that technological interactions such as Google Docs, Google Classroom, and Edmodo significantly impact student involvement. Eading et al. (2020) also discovered that using Google Classroom as a learning tool to improve students' reading comprehension was quite effective.

Students gained increased access to learning by using their smartphones without regard for time or place constraints. Based on these findings, institutions and governments are urged to develop policies that promote e-learning by supporting online learning through adequate internet access and by enacting laws that regulate the use of online learning.

Conclusion

This study has shown that flipped learning effectively improves student learning outcomes. The following results confirm this: a) The average score of student learning outcomes in the experiment class ($x=70.11$) is higher than that of in the control class ($x=58.70$); b) The calculation result of t-count (2.99) is higher than the t-table at a significant level of 5 percent, namely 2,037.3 which indicates that flipped learning affects student learning outcomes; c) The effect size calculated is 1.106, indicating a sizable effect of using the flipped learning approach which includes high criteria with an influence percentage of 86 percent according to Cohen's criteria. This indicates an effect of flipped learning on student learning outcomes.

For the lecturer and next researcher, the following factors must be considered to optimize the implementation of flipped learning:

1. Utilizing a Learning Management System (LMS) to monitor student understanding development
2. Collaborating with students' parents to monitor student's independent learning process
3. Giving project assignments to monitor student progress truly

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