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BOOSTING STUDENTS' READING COMPREHENSION ATTAINMENT WITH FLIPPED CLASSROOM MODEL: A PILOT STUDY AT STATE POLYTECHNIC OF SRIWIJAYA

Research Article

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Abstract

The study investigated the impact of the flipped classroom on the second semester students in accounting class. Participants ($n=50$) were assigned to a control group (using traditional instruction) or an experimental group (using flipped classroom model). A quasi-experiment in reading comprehension course on the second semester in academic year 2021-2022 was used. The Kolmogorov-Smirnov and Shapiro-Wilk test were .083 and .156 for pre-test control group, .200 and .787 for post-test control group, .119 and .185 for pre-test experimental group, and .095 and .101 for post-test experimental group suggesting normal distributions ($p>.05$). Homogeneity tests based on mean, median, median and with adjusted df , and trimmed mean were .857, .827, .827, and .857 indicating that Homogeneity tests were $>.05$. Pre-test scores of both groups compared by using independent t-test revealed no significant difference between these groups ($.505>.05$), while post-test scores of both groups showed significant difference ($.000<.05$). ANCOVA was conducted to see an interaction between the treatment and the post-test scores in which $F=38.642$, $p<.05$ means that the experimental group outperformed the control group. Likert Scale Questionnaire revealed that the students were highly satisfied with the flipped classroom. This also confirmed the difference between the control and experimental groups.

Keywords: flipped classroom, procedures in flipped classroom, concept in teaching reading

1. Introduction

The coronavirus disease (COVID-19) outbreak has wreaked havoc on people all over the world. This situation has resulted in the broad suspension of face-to-face activities at educational institutions in over 190 countries in order to prevent the virus's transmission and impact. More than 1.2 billion students at all levels of education have stopped taking face-to-face classes by mid-May 2021, according to data from the United Nations Educational, Scientific, and Cultural Organization (UNESCO). This is being done in order to avoid the spread of Covid-19 infection. It is hoped that all educational institutions will refrain from carrying out their normal activities, so limiting the spread of Covid-19. Various countries that have been exposed to this disease have implemented lockdown or quarantine laws in an effort to restrict the interaction of many people who could provide access to the spread of the Covid-19.

Many governments made steps to prevent the virus from spreading and to preserve the educational process's continuity, and colleges all around the world adopted online learning. While, in general, education has been delivered via digital media, which has had a significant impact on teaching. In other words, online teaching has become an indisputable reality that during the Covid-19 pandemic, online teaching has become a highly valuable medium for education and knowledge access (Chen Hsieh, Wu & Marek, 2017).

It comes to reason that today's technologies have revealed the nature of the teaching profession, requiring every lecturer to be prepared to use new teaching approaches and alternative learning models to tailor their instruction to their students' particular needs. The flipped classroom approach of instruction, which ensures the availability of online content learning, is an example of its possible use of digital technology. The flipped classroom model of instruction is a relatively new teaching technique that tries to improve student engagement and performance by using technology to bring lectures outside of the classroom and learning activities to bring assignments and exercises with concepts within (Bergmann & Sams, 2012; Brunzell & Horejsi, 2011; Tucker, 2012). The core idea behind this blended learning strategy is to flip the traditional instructional approach: in-class instruction is now accessed at home, in advance of class, via teacher-created videos and interactive lessons, and work that was previously completed outside of the classroom is now completed in class in the presence of the teacher. According to Tucker (2012), class becomes a place to "work through problems, progress concepts, and engage in collaborative learning" when using an inductive approach (p. 82). By actively engaging in the reading comprehension content, such a use of class time may provide students with the opportunity to learn how to think for themselves.

The goal of this research was to see how a flipped classroom approach of instruction affected students' reading comprehension in an undergraduate reading comprehension course. The study focused on two primary research questions: (1) What are the variations in students' reading comprehension achievement between flipped classroom classes and traditional learning following the course? (2) After the course, how did students feel about the traditional and flipped classroom models of instruction?

2. Literature Review

2.1. Flipped Classroom

Education has also begun to familiarize itself with and adapt to diverse technology-assisted learning methodologies. It does not wander; in fact, this has become a new habit for society, particularly students, who are unable to remain unaffected by technological advancements.

According to Bergmann & Sams (2012), the essential concept of a flipped classroom is the practice of giving learning materials to be supplied at home, as opposed to traditional learning, which entails the provision of teaching materials in the classroom. Constructivist learning is also often connected with the flipped classroom paradigm. Furthermore, according to Bishop & Verleger (2013), the flipped classroom focuses on a computer-based outdoor learning process as well as interactive group-based classroom learning. When it comes to technology in education, we all know that there is a learning paradigm that mainly relies on technological sophistication and knowledge. FC is the learning model in question.

When utilizing an experimental methodology, several FC research have shown that FC has a significant impact on student performance (Deslauriers & Wieman, 2011; McLaughlin et al., 2014; Hung, 2015; Karimi & Hamzavi, 2017; Fattah, 2017; Turan & Akdag-Cimen, 2019).

Sherrow, Lang, and Corbett (2016) discovered that increased interaction with peers, engaging collaborative tasks, and extended in-class time for practice resulted in an increase in school attendance and student performance in their study of the impact of the FC model on a

business communication course. FC, according to Borchardt & Bozer (2017), can also be utilized to improve the interaction between teachers and students. Students in a flipped classroom are expected to participate in a lot of class discussion in order to gain knowledge and understanding of ideas.

Several studies have also found that the FC atmosphere encourages student participation and active engagement (Al-Zahrani, 2015; Elmaadaway, 2018; Steen-Utheim & Foldnes, 2018). A number of studies in the literature that looked into the relationship between the FC approach and learning styles found that FC has more benefits for different learning styles of students than Traditional Classroom (TC), and that FC instructional practices develop a greater awareness of different learning and teaching styles both at home and in the classroom (Zappe et al., 2009; Strohmyer, 2016).

In a flipped classroom, students watch learning material at home in the form of videos or other media, explore the contents of the video as important knowledge to be discussed with other students in class, and receive an explanation of the learning material from the teacher, according to Garcia & Fidalgo-blanco (2016). According to Fraga and Harmon (2014), the FC is an inverted class whose activities are passed by giving content in the form of video, audio, or photos in pre-class sessions and discussing in depth in the classroom the next session.

Students in a traditional class get learning materials in class and are then given homework to complete outside of class/at home. Traditional learning, on the other hand, makes students passive and frequently results in learning issues (Abeysekera & Dawson, 2015). In the flipped classroom paradigm, students receive learning materials while still at home, and more specifically, before face-to-face sessions in class.

This stage necessitates the lecturer's willingness to construct learning activities that promote FC implementation. This project can take the form of creating films, images, or power point slides that can be used to impart information to pupils about the topic at hand. According to Wolff and Chan (2016), the lecturer already provides resources (documents, audio, and video) depending on educational content. Students have access to these resources outside of the classroom. To best support the students' learning, the lecturer puts up an in-classroom homework assignment based on the educational resources that the students had previously seen at home, giving the students the opportunity to practice and reinforce their learning in the classroom.

Lecturers have posted prior lesson content to YouTube channels or asynchronous learning technologies, such as Learning Management System, in order to adopt the FC model of learning (LMS). Furthermore, the lecturer instructs students to watch and memorize it, as well as write brief notes on crucial ideas or concepts that they have not yet grasped. In addition, while in class, small notes in the form of crucial points or things that have not been understood can be asked and discussed with the lecturer and other classmates.

In 2021, the world of education utilized many of the above online learning applications during the Covid-19 pandemic. The utilization of these applications is, of course, contingent on variables such as convenience of use and effectiveness.

2.2. Procedures in Flipped classroom

"Students acquire early exposure to new content outside of class, usually through reading or lecture videos, and then use class time to complete the tougher job of integrating that knowledge, whether through problem solving, discussion, or debates," according to the flipped classroom model (Brame, 2013, p.1). As a result, the teaching/learning effort becomes much more student-centered, and "class time is meant for delving deeper into themes and providing better learning opportunities" (Hamdan et al, 2013, p.5).

There are some flipped classroom practices that can be used to teach reading. According to Bergman and Sams (2012, p.13), the procedures are as follows: (1) lecturer must give video as media in reading before coming to class today, (2) lecturer starts a questions and answer session, (3) students ask questions about the previous night's video and teacher helps clarify misconceptions, (4) then lead the class through a few examples text that reflect the content students learned the night before and take any further questions, and (5) students completed and turned in their assignments.

The processes are based on the theory and include using a video as a media in reading before teaching in class. After that, ask them a question to find out what they learned from the video. Then, include language that is relevant to the video's content. Last but not least, the kids are working on the task, and the teacher is checking to see if they have grasped it. Meanwhile, according to Drake, Kayser, and Jacobowitz (2016, p.7), flipped classroom techniques are as follows: (1) A lecturer would spend around 30 minutes teaching and having the students take notes before flipping his class, (2) the remaining 10 minutes would be dedicated to discussion of the content, (3) now that students are receiving lectures and taking notes through video at home, and (4) The entire class session can be devoted to active study and discussion.

Based on the hypotheses presented above, the writers determined that flip processes require students to take notes while the lecturer explains what will happen next. Then, at home, review the content while taking notes on the video's topics, and then discuss it again at school.

2.3. Concept in Teaching Reading

Teaching reading entails more than just teaching how to read. One of the purposes of reading is to comprehend the text. When teaching reading, the lecturer must pay close attention to the students. The reading process must be enjoyable for students. Lecturers must consider how to boost classroom reading text because teaching reading requires more than just reading the text.

To put it another way, teaching reading is not the same as passive learning. During the reading process, students must have fun (Alyousef, 2006). As it is well known, one of the benefits of reading is that it provides students with knowledge that they have never had before. However, teaching reading requires more than just reading the text; lecturers must pay close attention to how to teach reading text to our students. Furthermore, lecturers should have or prepare the stages of teaching reading in order to make the process of teaching reading easier.

3. Method

3.1. Research Design and Participants

A quasi-experimental methodology was used in this study to examine the effectiveness of flipped learning. Furthermore, combining quantitative and qualitative data collecting allows for a more comprehensive understanding of students' flipped-learning experiences and perceptions. The data include two types. First, student reading comprehension attainment. Second, student perceptions.

The writers selected two classes of second semester students at accounting study program in the academic year 2021-2022 at State Polytechnic of Sriwijaya as the research subjects. The numbers of students in the two classes were 25 and 25. The experimental group was made up of 25 students (14 females and 11 males), while the control group consisted of 25 students (17 females and 8 males). Two groups were taught by the same lecturers. The experimental group was instructed with FC model, while the control group has a traditional instructional setting.

The reading comprehension course was a three-credit course and was offered during the odd semester of 2021. It was taught once a week on Tuesday, 150 minutes on one teaching and learning meeting time. The semester-long course run for a total of 20 weeks including final

semester test at the end of teaching and learning meeting. Our quasi-experiment started from the 1st week and continued until the end of the semester. After discussing with the lecturer, the writers selected to use the reading comprehension course developed by State Polytechnic of Sriwijaya. This course included 12 chapters focusing on 1) determining the main idea, sentence, paragraph, or discourse; 2) determining core points; 3) understanding the flow and instructions; 4) determining the organization of reading materials; 5) determining visual images and other images of reading; 6) concluding; 7) predicting meaning and conclusion; 8) summarizing the discourse read; 9) distinguishing between facts and opinions, and 10) getting information from various sources, such as encyclopedias, atlases, maps, or digital annotation tools

3.2. Instruments

A pre-test and post-test of reading comprehension and post-task questionnaire survey were conducted. The pre-test and post-test comprised a forty-multiple choice reading comprehension test. It was administered to both groups as pre-test before instruction and post-test after instruction. Items of questionnaire were adapted from “Effect of the flipped classroom model on a secondary computer applications course: Student and teacher perceptions, questions and student achievement,” by Johnson and Renner (2012). The questionnaire included 11 closed items regarding the students’ views on course content and delivery, assessment and evaluation, as well as communication and learning experiences. These questions are (1) I communicated a lot with other students, (2) I talked a lot with the teacher, (3) I had to work hard on this course, (4) I have learned a lot on this course so far, (5) the assignments and projects I have worked on for this course have dealt with real life applications and information, (6) the availability of course materials, communication, and assessment tools has helped me improve my learning, (7) I have applied my out-of-class experiences and learned from practical applications, (8) I have explored my own strategies for learning, (9) I have needed technical assistance for this class, (10) the availability and access to technical support and resources have helped me improve my learning, and (11) I would choose to take another course like this one. At the end of the course, students completed a survey. The answer to each question was designed using a five-point Likert scale ranging from ‘Strongly Agree’ (5) to ‘Strongly Disagree’ (1), a 5 point Likert scale was used.

3.3. Procedure

Concerning quantitative data, the pre-test and post-test were administered to both groups respectively on the first and the last day of the experiment, while the students’ experience of the FC and traditional learning were only applied at the end of experiment.

As for the survey, it was turned into a google form to facilitate quick evaluation, and then it was sent to the WhatsApp numbers in a group of participants. After being collected, all the data were transferred to SPSS 25.

3.4. Data Analyses

The data obtained from the survey and the pre-test and post-test were analyzed using SPSS 25. The data of survey was calculated with Likert Scale. The data of pre-test and post-test were first examined by descriptive statistics to explore mean, and standard deviation. Independent sample t-test was applied to compare the differences in the scores of both groups (control and experimental group). The variance in post-test learning performance in the two groups was then tested using analysis of covariance (ANCOVA). Before analyzing the data with paired t-tests and analysis of covariance (ANCOVA), the writers have analyzed the normality, and homogeneity of the data, then parametric test can be applied.

The quantitative data analyses (pre-test and post-test) were evaluated quantitatively to analyze the differences between the scores of both groups (FC vs Traditional classroom model). To determine whether the data follows a normal distribution, the writers carried out Kolmogorov-Smirnov and Shapiro-Wilk normality test, and to know whether the obtained data has a homogeneous variance or not, test of Homogeneity of Variances with SPSS 25 by the value of significance (α) = 0.050 was carried out.

Table 1. *Descriptive Statistics*

	N	Minimum	Maximum	Mean	Std. Deviation
Pre-test Control Group	25	50	70	60.20	5.859
Post-test Control Group	25	50	78	65.60	6.758
Pre-test Experimental Group	25	53	70	61.24	5.060
Post-test Experimental Group	25	63	88	77.40	6.665
Valid N (listwise)	25				

From the table 1, it was found that the total number of each class was 25 students. The minimum score of pre-test in experimental class was 53 and the maximum score was 70, while in post-test the minimum score was 63 and maximum was 88. On the other hand, in control class the pre-test minimum's score was 50 and maximum was 70 while in post-test, the minimum score was 50 and the maximum one was 78.

The obtained data for normal distribution and the significance value for Kolmogorov-Smirnov test and Shapiro-Wilk test were found to be .083 and .156 for pre-test control group, .200 and .787 for post-test control group, .119 and .185 for pre-test experimental group, and .095 and .101 for post-test experimental group suggesting normal distributions ($p > .05$).

Table 2. *Tests of Normality*

Classes	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre-test Control Group	.164	25	.083	.941	25	.156
Post-test Control Group	.119	25	.200*	.976	25	.787
Pre-test Experimental Group	.156	25	.119	.944	25	.185
Post-test Experimental Group	.161	25	.095	.933	25	.101

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

a. Lilliefors Significance Correction

As the data were found to follow a normal distribution, then Homogeneity test was carried out to draw a conclusion about whether two populations have the same distribution. From the table below, based on mean the significance result of post-test of experimental and control class was .857. It can interpretation based on the criteria for acceptance or rejection of homogeneity test, If the value (p) > significant ($\alpha=0,05$), the sample was homogenous and the result of pre-test was $.857 > .05$ therefore the data was homogenous and valid. It also means the students had the same characters on reading comprehension.

Table 3. *Test of Homogeneity of Variance*

		Levene	df1	df2	Sig.
		Statistic			
Reading	Based on Mean	.033	1	48	.857
Comprehension Scores	Based on Median	.048	1	48	.827
	Based on Median and with adjusted df	.048	1	46.452	.827
	Based on trimmed mean	.033	1	48	.857

The next step is an independent sample t-test was conducted to compare the differences in the scores of either group. The items of survey were also analyzed with Likert scale at the end of experiment.

4. Results

4.1. Results related to 1st research question

In order to get more reliable results in the end, the pre-test scores of both groups were examined before the instruction began. As shown in the table 4, the control group (M=60.20, SD=1.172) did not outperformed the experimental group (M=61.24, SD=1.012).

Table 4. *The Means of the Pre-test Score*

	Class	Group Statistics			
		N	Mean	Std.Deviation	Std.Error Mean
Pre-test of Reading	Pre-test Control Group	25	60.20	5.859	1.172
Comprehension	Pre-test Experimental Group	25	61.24	5.060	1.012

The results of independent sample t-test of pre-test, as illustrated in the table 5, showed that there was no significantly difference between the success rates of two groups ($p > .05$). It means that the levels of participants in both groups were similar, which contribute to the reliability of the study. However, an independent samples t-test (table 6) was also conducted to determine whether the difference between post-test scores of both groups was statistically significant or not.

Table 5. *Independent Samples t-test of Pre-test*

		Reading Comprehension Pre-test		
		Equal variances assumed	Equal variances not assumed	
Levene's Test for Equality of Variances	F	.410		
	Sig.	.525		
t-test for Equality of Means	t	.672	.672	
	df	48	47.004	
	Sig. (2-tailed)	.505	.505	
	Mean Difference	1.040	1.040	
	Std. Error Difference	1.548	1.548	
	95% Confidence Interval of the Difference	Lower	-2.073	-2.075
		Upper	4.153	4.155

Table 6. *Independent Samples t-test of Post-test*

		Reading Comprehension Post-test		
		Equal variances assumed	Equal variances not assumed	
Levene's Test for Equality of Variances	F	.033		
	Sig.	.857		
t-test for Equality of Means	t	6.216	6.216	
	df	48	47.991	
	Sig. (2-tailed)	.000	.000	
	Mean Difference	11.800	11.800	
	Std. Error Difference	1.898	1.898	
	95% Confidence Interval of the Difference	Lower	7.983	7.983
		Upper	15.617	15.617

The results of independent sample t-test of post-test, as illustrated in the table 6, showed that there was significantly difference between the success rates of two groups ($p < .05$). In relation to the first question, the results showed that although significant difference was seen between the post-tests of experimental and control group, the overall performances of the students who were instructed in FC and the ones who were instructed in traditional instruction, it seems that FC model had a bigger effect concerning students' reading comprehension attainment.

Then, Analysis of covariance (ANCOVA) was then applied to test the variance in post-test learning performance in the two groups. The main data that were taken from students' post-test scores were calculated by using ANCOVA. ANCOVA was conducted to see whether there was an interaction between the treatment and the post-test scores. The result of ANCOVA can be seen in the following Table 7.

Table 7. *The Output of ANCOVA.*

Tests of Between-Subjects Effects						
Dependent Variable: Post-test Scores						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1740.500 ^a	1	1740.500	38.642	.000	.446
Intercept	255612.500	1	255612.500	5675.023	.000	.992
Class	1740.500	1	1740.500	38.642	.000	.446
Error	2162.000	48	45.042			
Total	259515.000	50				
Corrected Total	3902.500	49				

a. R Squared = .446 (Adjusted R Squared = .434)

The results showed that there was an overall statistically significant difference in post-test scores between the different groups (control and experimental groups) and adjusted means ($F = 38.642$, $p < .05$) in such a way that the experimental group outperformed the control group in reading comprehension. Therefore, the research question of the study was verified.

4.2. Results related to 2st research question

Table 8. *Post-task survey items and results concerning students' experience of the traditional instruction*

Student	Total Score	Maximal Score	%	Minimal Score	Maximal-Minimal Score	Interval	Category
1.	25	55	45,45	11	44	9	Strongly Disagree
2.	30	55	54,55	11	44	9	Disagree
3.	29	55	52,73	11	44	9	Strongly Disagree
4.	26	55	47,27	11	44	9	Strongly Disagree
5.	29	55	52,73	11	44	9	Strongly Disagree
6.	28	55	50,91	11	44	9	Strongly Disagree
7.	26	55	47,27	11	44	9	Strongly Disagree
8.	27	55	49,09	11	44	9	Strongly Disagree
9.	27	55	49,09	11	44	9	Strongly Disagree
10.	27	55	49,09	11	44	9	Strongly Disagree
11.	33	55	60,00	11	44	9	Disagree
12.	29	55	52,73	11	44	9	Strongly Disagree
13.	27	55	49,09	11	44	9	Strongly Disagree
14.	31	55	56,36	11	44	9	Disagree
15.	32	55	58,18	11	44	9	Disagree
16.	29	55	52,73	11	44	9	Strongly Disagree
17.	30	55	54,55	11	44	9	Disagree
18.	34	55	61,82	11	44	9	Disagree

19.	31	55	56,36	11	44	9	Disagree
20.	33	55	60,00	11	44	9	Disagree
21.	33	55	60,00	11	44	9	Disagree
22.	32	55	58,18	11	44	9	Disagree
23.	27	55	49,09	11	44	9	Strongly Disagree
24.	30	55	54,55	11	44	9	Disagree
25.	22	55	40,00	11	44	9	Strongly Disagree

The results of the survey delivered to the control group after the treatment are presented in Table 8. There are two categories found, strongly disagree and disagree. Among the 11 items, 56% of students said that they strongly disagree towards traditional instruction, and 46% of the students reported that they disagree with the traditional instruction while learning reading comprehension course.

Table 9. *Post-task survey items and results concerning students' experience of the flipped learning model*

Student	Total Score	Maximal Score	%	Minimal Score	Maximal-Minimal Score	Interval	Category
1.	50	55	90,91	11	44	9	Strongly Agree
2.	43	55	78,18	11	44	9	Agree
3.	49	55	89,09	11	44	9	Strongly Agree
4.	47	55	85,45	11	44	9	Agree
5.	45	55	81,82	11	44	9	Agree
6.	48	55	87,27	11	44	9	Strongly Agree
7.	45	55	81,82	11	44	9	Agree
8.	47	55	85,45	11	44	9	Agree
9.	44	55	80,00	11	44	9	Agree
10.	50	55	90,91	11	44	9	Strongly Agree
11.	50	55	90,91	11	44	9	Strongly Agree
12.	45	55	81,82	11	44	9	Agree
13.	42	55	76,36	11	44	9	Agree
14.	45	55	81,82	11	44	9	Agree
15.	46	55	83,64	11	44	9	Agree
16.	49	55	89,09	11	44	9	Strongly Agree
17.	47	55	85,45	11	44	9	Agree
18.	46	55	83,64	11	44	9	Agree
19.	47	55	85,45	11	44	9	Agree
20.	44	55	80,00	11	44	9	Agree
21.	50	55	90,91	11	44	9	Strongly Agree
22.	44	55	80,00	11	44	9	Agree
23.	52	55	94,55	11	44	9	Strongly Agree
24.	48	55	87,27	11	44	9	Strongly Agree
25.	43	55	78,18	11	44	9	Agree

The results of the survey presented in Table 9 belonged to the experimental group treated with FC model. It was found that 36% of students strongly agree with the application of FC model in their reading comprehension course, while 64% of students chose 'agree' when their lecturer applied FC model in the teaching and learning process of reading comprehension course.

This study found a significant difference between the success rates of the students in FC versus traditional instruction. The findings revealed that control group did not outperform the experimental group, suggesting that FC model positively and significantly to the reading comprehension attainment of the students. The current findings absolutely support the previous research found that the success rates of the students in FC were higher than those of the students

in traditional instruction (Deslauriers & Wieman, 2011; Bergmann & Sams, 2012; McLaughlin et al., 2014; Hung, 2015; Yestrebsky, 2016; Fattah, 2017; Karimi & Hamzavi, 2017; Turan & Akdag-Cimen, 2019). The surprising result of the present study is in line with some previous studies revealing that FC improved students' learning performances and increased their motivation compared to traditional instruction as it helped them to explore new things by developing skills of critical thinking.

Based on the findings of survey as a whole, it can be concluded that students in the experimental group positively enjoyed the reading comprehension course compared to those of the students in the control group. These results are in line with results of some previous studies revealing a high level of student satisfaction with FC model (Bishop & Verleger, 2013; Al-Zahrani, 2015; Sherrow, Lang, and Corbett, 2016; Borchardt & Bozer, 2017; Elmaadawa, 2018; Steen-Utheim & Foldnes, 2018).

4. Conclusion

This study confirms that FC is effective to learn by applying a quasi-experiment research. For this small sample of students, the flipped classroom approach found to have significant impact on students than the traditional instruction model. Students in the flipped classroom show appreciation for the method and their survey results recommend this model. In the traditional class students waited for their lecturer to tell them what to learn, how to learn, when to learn it, and how to prove they had learned it. Even though their lecturer has motivated students, they tend to undertake a passive role in their learning. With the flipped model students are forced to play a much more active and responsible role in their own learning process.

Class activities of the flipped model makes learning the center of the class. The students must work as hard as the lecturer. The class is more of a conversation instead of being simply monotonic. As students study a given topic before class, their participation during class time is more active and may also explain their difficulties better.

Data generated from this study suggests that the flipped classroom strategy had excessive impact on academic gains. These results were consistent with results from several studies which have reported a significant increase in student learning outcomes using a flipped classroom model, such as Wilson (2013) and Gillispie (2016).

5. Conflict of Interest

The authors declare that there is no conflict of interest.

6. Ethics Committee Approval

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

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