The Effect of Flipped Learning (Revised Learning) on Iranian Students' Learning Outcomes

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Abstract

The purpose of this study was to investigate whether the flipped (revised) learning had effect on student learning outcome. Lage et al (2000) describes the flipped classroom as " Inverting the classroom means that events that have traditionally take place inside the classroom now take place outside the class and vice versa" (p.32). The participants in this study were 250 students and five teachers from a secondary school in Ardabil. Homogenous students were selected on the basis of their scores in the last year. Ten classes were considered for investigation. There were 25 students in each class and each teacher taught two classes that one of classes was flipped class and another was ordinary class. T-test was used to compare the overall performances of two classes in each subject in order to determine the effect of flipped learning on students' learning outcomes. The findings of this research demonstrated that there were significant differences between flipped and ordinary classes in students' learning outcomes.

Keywords: flipped class, tradition class, learning outcomes

1. Introduction

Flipped learning is still in its early development. To date, there is no scientific research base to state exactly how well flipped classrooms work. Yarbo et al (2014) point that flipped learning is a "pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the education guides students as they apply concepts and engage creatively in the subject matter." (p. 5) Prince (2004) mentioned the foundation of flipped learning is Active learning. (p.32) Active learning, operationalized by cognitive, metacognitive, affective and resource management learning strategies, is necessary for students to effectively cope with the high level of demands placed on the learner in a constructivist learning environment.(Anthony, 1996)Good and Brophy (1994) said that in constructivist learning (a) Learners construct their own meaning. (b) New learning builds on prior knowledge. (c) Learning is enhanced by social interaction. (d) Meaningful learning develops through "authentic" tasks. The traditional pattern of teaching has been to provide students to read textbooks and work on problem sets outside school, while listening to the teacher and taking tests in class. A flipped classroom changes the traditional educational model so that the content is token outside of class, while class time is spent on homework. For example, students may access instructional material through videos before coming to the class. Then during class time, students work on activities, which force them to use what they have learned. The main goal of a flipped classroom is to improve students' learning and achievement by exchanging the traditional model of a classroom, emphasizing class time on student understanding rather than on lecture.

The traditional model   The flipped model

2. Review of the Related Literature

Anderson and Krathwohl (2001) stated flipped learning means that students are doing the lower levels of cognitive work (such as gaining knowledge and comprehension) outside of class, and focusing on the higher forms of cognitive work (such as application, analysis, synthesis, and evaluation) in class, where their peers and teachers support them. Flipping classrooms has been described as: 'providing students with a video that explains the concepts, structure and skills, so that when they get to class… they can get into a real 'workshop' of learning. In this way, the teacher is on hand to give practical assistance, check progress and pick up common errors' (Boyer, 2013, p. 28). Educause (2012, p. 1) also refers to the use of videos in flipped classrooms: Short video lectures are viewed by students at home before the class session, while in-class time is allocated to exercises or discussions. The video lecture is often seen as the basic element in the flipped approach. Walvoord and Anderson (1998) propose that flipped class is a model in which students gain first-exposure learning prior to class and focus on the processing part of learning (synthesizing, analyzing, problem-solving, etc.) in class. To see that students do the preparation necessary for productive class time, they propose an assignment-based model in which students produce work (writing, problems, etc.) prior to class. The students receive productive feedback through the processing activities that occur during class, decreasing the need for the teachers to provide considerable written feedback on the students' work. The flipped classes is really about being student centered and flexible with the chooses someone has once he/she's freed up in this class time (Moran &Young, in press as cited in Cockrum 2014).In a recent studies of flipped class teachers nearly 90% of teachers reported an improvement in their own job contentment after flipping their classes. (classroom window and flipped learning network, 2012). According to Hamdan et al (2013) flipped learning has four main features:

1) Flipped Learning needs flexible environments;

2) Flipped Learning needs a shift in learning culture;

3) Flipped Learning needs intentional content;

4) Flipped Learning needs professional educators.

3. Research Questions

1. Does the flipped classroom affect the achievement of second grade students in English class?
2. Does the flipped classroom affect the achievement of second grade students in Arabic class?
3. Does the flipped classroom affect the achievement of second grade students in Math class?
4. Does the flipped classroom affect the achievement of second grade students in science class?
5. Does the flipped classroom affect the achievement of second grade students in Geography class?

3.1 Null Hypotheses

1. The flipped class doesn't affect on the achievement of second grade students in English class?
2. The flipped class doesn't affect on the achievement of second grade students in Arabic class?
3. The flipped class doesn't affect on the achievement of second grade students in Math class?
4. The flipped class doesn't affect on the achievement of second grade students in Science class?
5. The flipped class doesn't affect on the achievement of second grade students in Geography class?

4. Method

The sample was formed by 255 participants (5 teachers and 250 students) from Asiyeh school. The teachers were selected on the way that the sample covered different subject teachers. In flipped classes, the students first studied the topic by themselves, typically using video lessons prepared by the teachers. To do this, teachers gave short video lectures for students to view at home prior to the next class session. This allowed class time to be devoted to expanding on and mastering the material through exercises, projects, and discussions. During flipped class, teachers wanted to limit the amount of time their lecture, and increased the time students spend applying the day's material to absorbing problems. Students worked collaboratively on problems, gave each other support and feedback. Teachers circulated among their students to check in on their understanding, answered their questions, and encourage them to think more deeply. Class discussion was supported by teacher feedback, but there was no formal lecture was included in the flipped classes. The ordinary class was lectured the same materials in class by the teachers . Therefore all of the teachers ran two classes with identical material and assignments, one flipped and one conventional class . The period of treatment was half semester. (about 8 weeks)

5. Results & Discussion

In this study, the statistical techniques such as mean ($\bar{x}$), standard deviation (Std. Dev.) and the t-test were used in the analysis of the data. The p value was held at 0.05. Significance level was determined by taking p values into consideration so that $p > .05$ meant there was not a meaningful difference and $p < .05$ meant there was a meaningful difference. Independent t-test was appropriate for this study as it allowed the researcher to determine the existence of differences between flipped classes and ordinary classes in their learning outcomes. To provide a statistical analysis in order to answer the research questions, the collected data from mid term test , were submitted to statistical analysis. The analysis consisted of an independent t-test to compare the overall performances of two classes in order to see the effect of flipped (revised) learning of students on learning.

Analysis of Hypothesis 1

The first hypothesis of the study was:

1. The flipped class doesn't affect on the achievement of second grade students in English class. The accounted t-value between the average scores of the two classes is to (48) = 0.028. The data obtained are statistically significant in 0.05 level, therefore the first null hypothesis was rejected.

Table 1. Means and Standard deviation obtained in the first term test of English class

	N	Mean	Standard deviation
Flipped class	25	17	0.90
Ordinary class	25	15	1.45

Table (1) shows class statistics. From this we can see that $\bar{x}$=17 and SD=0. 90 (flipped class), and $\bar{X}$=15 and SD=1. 45 (ordinary class) and the difference between two classes is statistically significant (t=0.028).

Analysis of Hypothesis 2

The second hypothesis of the study was:

2.The flipped class doesn't affect on the achievement of second grade students in Arabic class. The accounted t-value between the average scores of the two groups is to (48) = 0.14. The data obtained are not statistically significant in 0.05 level.

Table 2. Means and Standard deviation obtained in the final term test of Arabic class

	N	Mean	Standard deviation
Flipped class	25	16	1.50
Ordinary class	25	15	2.25

Table (2) shows class statistics. From this we can see that $\bar{x}$=16 and SD=1. 50 (flipped class), and $\bar{x}$=15 and SD=2.25 (ordinary class) and the difference between two groups is not statistically significant (t=0.14), therefore the second null hypothesis was supported.

Analysis of Hypothesis 3

The third hypothesis of the study was:

3.The flipped class doesn't affect on the achievement of second grade students in Math class. The accounted t-value between the average scores of the two groups is to (48) = 0.012. The data obtained are statistically significant in 0.05 level.

Table 3. Means and Standard deviation obtained in the final term test of Math class

	N	Mean	Standard deviation
Flipped class	25	16.90	0.75
Ordinary class	25	14.70	1.50

Table (3) shows group statistics. From this we can see that $\bar{x}$=16. 90 and SD=0. 75 (flipped class), and $\bar{X}$=14. 70 and SD=1. 50 (ordinary class) and the difference is statistically significant (t=0. 012), therefore the third null hypothesis was rejected.

Analysis of the Hypothesis 4

The fourth hypothesis of the study was:

4. The flipped class doesn't affect on the achievement of second grade students in science class.

The accounted t-value between the average scores of the two groups is to (48) = 0.0018. The data obtained are statistically significant in 0.05 level.

Table 4. Means and Standard deviation obtained in the final term test of Science class

	N	Mean	Standard deviation
Flipped class	25	17.85	1.35
Ordinary class	25	15.65	1.40

Table (4) shows group statistics. From this we can see that $\bar{x}$=17. 85 and SD=1. 35 (flipped class),and $\bar{X}$=15.65 and SD=1. 40 (ordinary class) and the difference is very statistically significant (t=0.0018), therefore the fourth null hypothesis was rejected.

Analysis of Hypothesis 5

The fifth hypothesis of the study was:

5.The flipped class doesn't affect on the achievement of second grade students in Geography class. The accounted t-value between the average scores of the two groups is to (48) = 0.016. The data obtained are statistically significant in 0.05 level.

Table 5. Means and Standard deviation obtained in the final term test of Geography class

	N	Mean	Standard deviation
Flipped class	25	17.30	2.70
Ordinary class	25	14.40	1.90

Table (5) shows group statistics. From this we can see that $\bar{x}$ =17. 30 and SD=2. 70 (flipped class), and $\bar{X}$ =14. 40 and SD=1. 90 (ordinary class) and the difference is statistically significant (t=0. 016), therefore the fifth null hypothesis was rejected. To sum up, the findings indicated that both flipped and ordinary classes were almost homogeneous in terms of their scores in last year, whereas in the mid term test of current academic year all the flipped classes had a better performance than ordinary except Arabic classes.

6. Conclusion

After 8 weeks the result of mid term test showed students of flipped classes were outperforming students of ordinary class. The result of this study is in line with Berrett (2012), Day& Foley (2006) McLaughlin et al . (2014), (Lizer & Wesner 2013, Kugler, Gogineni, Tai, Law,& Chung, 2013 as cited in Meeting Abstracts, 2013) . Also the result of this study is in consistence with Aronson& Arfstrom (2013, p. 2). They found that students in the flipped course scored more than twice as well as students in the control group on a multiple-choice test measuring comprehension of the content in the final week. Students also enjoyed the flipped experiment: 90% agreed that they enjoyed the interactive learning methods tried in the last week. The instructors concluded that using these active learning methods in a flipped course can improve both learning and engagement. The flipped classroom helps students learn to correct misconceptions and operate their new knowledge such that it is more reachable for future use by providing an opportunity for students to use their new knowledge while they have access to immediate feedback from peers and the teachers. Furthermore, the immediate feedback that takes place in the flipped classroom also helps students recognize and think about their own increasing understanding. Flipped learning is especially important since it enables the learning session to go beyond its context the four walls of the classroom. Teachers should take student interest in Flipped Learning very seriously. As Cockrum (2014) says the basic goal of flipped learning is to provide a student-centered learning environment. This gives teachers the ability to practice project-based learning, mastery, inquiry, peer instruction, constructivism, and more. A flipped class is one that inverts the typical regular of content acquisition so that students gain necessary knowledge before class, and instructors guide students to actively and interactively clarify, seek and use that knowledge during class. Reasons to Flip the Flipped Classroom is; Because in flipped classroom the student has control over the pace of Instruction by pausing, re-listening and re-watching to film or video on their own time. Class time is then allocated to application. The flipped classroom places the responsibility for learning on the students. In flipped classroom students don't seat passively and silently through a session, because the instructor is not there to lecture or present, but to support their work. Flipped class is a means to improve interaction between students and teachers. When students are absent , don't get left behind, they can edge up to others.
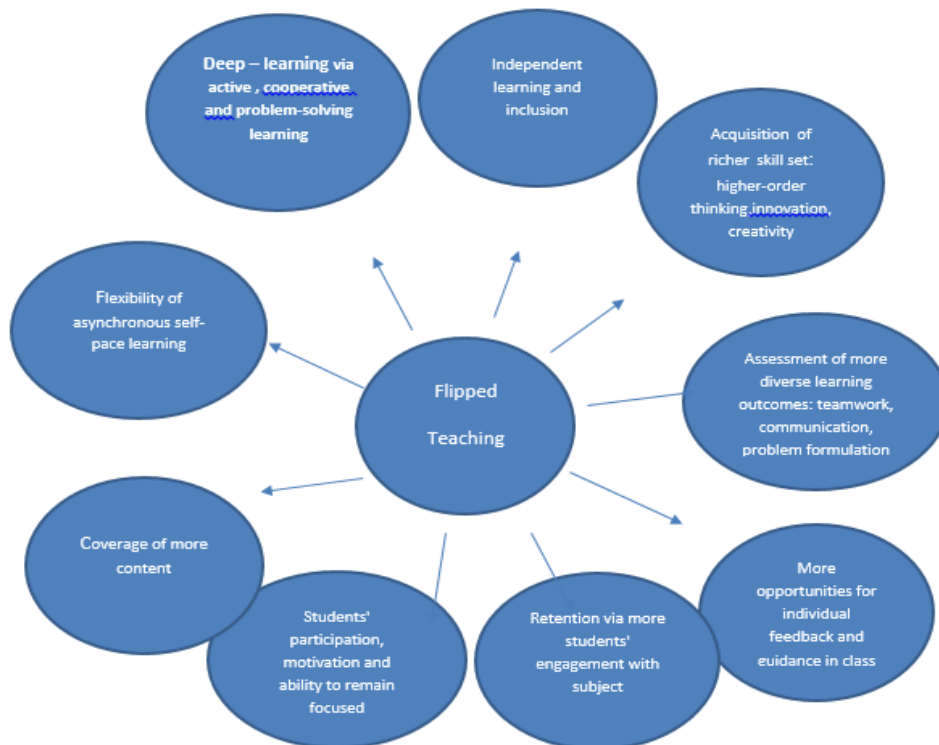

Figure 1. benefits of flipped vs. traditional teaching (Uskov et al, 2015)

6.1 Limitation

If the teachers don't want students to watch the videos or complete the activities before the class they will be unprepared to use their new knowledge during the class time. Also, creating the instructional videos or materials for a flipped class can be demanding for teachers . Teachers involved with flipped classes must be prepared for time-consuming and demanding works. Remember, in addition to the preparation work before class, a flip requires the teachers to guide students as they apply their new knowledge in the classroom. Despite these limitations, the Flipped learning poses an innovative approach to teaching with the potential to create dynamic, energetic, engaged and learning-centered classrooms. Finally very important point is: if students don't have access to technology?

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