

The Impact of Flipped Classroom Approach on College Students' Academic Achievement and Motivation

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ABSTRACT

This quasi-experimental study investigated the flipped classroom approach's impact on the academic achievement and motivation of seventy-six female college students who were around 21 years old. They enrolled in one of the teacher education programmes. Pre- and post- tests were employed to assess achievement, whereas two separate scales were used to evaluate motivation. Results of the academic achievement post-test revealed mean scores of 50.08 and 40.93 for the experimental and control groups respectively, with a t value of 3.70, which is statistically significant at the .01 level. Regarding motivation, for the first scale, mean scores of 3.51 and 3.24 were obtained by the experimental and control groups respectively, with a t value of 2.00, which is statistically significant at the .05 level. As for the second motivation scale, mean scores of 3.46 and 3.23 were obtained by the experimental and control groups respectively, with a t value of 2.00, which is statistically significant at the .05 level in favor of the former group. Based on these results, it can be concluded that the flipped classroom approach produced both improved motivation and academic achievement in the experimental group. This study was one of a few in the field that tackled flipped learning in relation to teaching English as a foreign language, and conducted on EFL students in their native country. Likewise, it was almost the only one, as based on data searching, that dealt with student teachers as participants

Introduction

Despite innovations in technology enabling alternative techniques for pedagogy, lecture formats continue to be the primary method for

teaching adult learners (Bligh, 2000), resulting in limited classroom interaction and diminished critical thinking (Shimamoto, 2012). Flipping the classroom is a relatively new technique (Started in 2007) and developed by Bergmann and Sams (2012), which focuses on personalized instruction and the fulfillment of students' individual needs (i.e., active learning and differentiated instruction). By eschewing one-size-fits-all lectures, the instructor functions as a 'guide to the side' rather than a 'sage on the stage.' Flipped learning entails exposing students to instruction outside of the classroom. In this scenario, class time provides an opportunity for learners to apply newly found knowledge during activities. In doing so, Bloom's taxonomy is reversed by prioritizing higher rather than lower-level skills that are infrequently emphasized or developed (i.e., application, analysis, synthesis, and evaluation versus knowledge and comprehension [Lockwood, 2014]).

Context of the problem:

The impetus for this study was the author's observation that some of her third and fourth level students enrolled in a preparatory program for English language teachers lacked motivation, and were very passive in their learning approach. Due to this, these students frequently fell behind in completing their assignments, and were therefore unable to present their final projects. This prompted a reevaluation of traditional face-to-face lecturing, and led to the implementation of the flipped classroom. In this new configuration, class time was devoted to active work rather than lectures, which were prerecorded and available to students outside of class hours.

Purpose of the study:

This study aims at examining the impact of this approach from the perspective of its effect on student motivation and academic achievement. Furthermore, it aims to improve the university's teaching strategies by using flipped classroom strategy.

Significance of the Study:

The significance of this study lies in the fact that it helps college students as prospective teachers to implement flipped learning in their elementary stage classes when teaching. Meanwhile, the study reinforces the use of technology in teaching and learning.

Literature Review

An effective flipped classroom implementation necessitates a proper theoretical understanding of active learning and differentiated instruction. As based on data searching, when compared to traditional classrooms, student performance and achievement in active learning environments is superior, and accompanied by improved conceptual understanding and retention of materials (Sezer, 2010). Whereas passive learners are merely receivers of information, active learners are full participants in the knowledge acquisition process, and therefore autonomous (Petress, 2008).

Likewise, research has highlighted the positive effects of differentiated instruction. For example, Marlow (2012) examined the effects of associated differentiation in a flipped classroom context on student achievement and stress levels. The results revealed a positive correlation between differentiation and independent study with increased achievement and decreased stress levels. In higher education, approaches extended to blended learning like a flipped classroom model have been adopted widely, wherein traditional face-to-face instruction is supplemented by activities outside of the classroom, which are frequently facilitated electronically to create more active learning (O'Flaherty & Philips, 2015).

The origins of flipped classrooms can be traced back to 2007, when science teachers Jonathan Bergmann and Aaron Sams opted to replace their classroom lectures with videos that could be viewed by students at home; class time was then dedicated to discussion and activities (Morgan, 2014). This model has not changed drastically since flipped learning's inception, regardless of educational level. In flipped instruction, technology is used to alter the classroom environment and its dynamics so that class time can be dedicated to interactive tasks and scaffolding e.g., teamwork, individual meetings with the instructor, and group/class discussions (Bergmann & Sams, 2012). The Khan Academy is a popular website based on this approach, which hosts videos covering a wide range of topics in science, mathematics, and the humanities that are supplemented by self-placement quizzes and discussion posts (Egbert, Herman, & Chang, 2014).

Based on the above literature review and for the purpose of this study, flipped classroom is defined as a model of active learning where

the roles of instructor and students are reversed through implementing technology. The students are exposed to the videos and links of the new lecture at home, then they come to class with clear vision about the new lecture and start to work with their peers through discussing details, analyzing concepts and facts, in addition to providing position and feedback. The instructor in the flipped classroom is a facilitator who gives support and guidance when needed.

Prior research has confirmed the effectiveness of flipped classrooms. In Hung (2014), a structured attempt was made to integrate flipped teaching into language classrooms by using the WebQuest active learning strategy; the results revealed enhanced learning during coursework when compared to a traditional classroom arrangement. In addition, participants indicated that they preferred flipped teaching to a traditional, lecture-oriented classroom format. Similarly, Touchton (2015) compared the performance of students in flipped and non-flipped classrooms and determined that performance was slightly better among participants in the former group. Moreover, several studies indicate that flipped classrooms lead to significant results because of shifts in how instruction is delivered (cf. Butt, 2012; Marlow, 2012; Shimamoto, 2012; Davies, Douglas, & Ball, 2013; Hung, 2014; Feledichuk & Wong, 2014; O'Flaherty & Philips, 2015).

With respect to flipped learning's impact on student achievement, Feledichuk and Wong (2014) observed an increase in final grades among international students enrolled in a flipped course. Similarly, Alyami, Saleh, and Alagab (2013) found that collaborative learning strategies boosted student achievement. In terms of learning motivation, Cole, Feild, and Harris (2004) assert that motivation entails, "the willingness to attend and learn material in a development program" (p. 67). Furthermore, they argue that whereas ability and intellect influence students' practices, motivation influences one's focus and the degree of effort exerted in learning. Hence, a flipped classroom's success is dependent on students not only taking on a substantial amount of out-of-class work, but also being intrinsically motivated to do so.

This research builds upon the aforementioned studies by examining flipped learning's effects on academic achievement and motivation among prospective teachers specifically, while also emphasizing the use of technology in teaching and learning. The multifaceted focus of this

study is based on the longstanding assertions of numerous researchers that changes should be made to the flipped learning approach in order to increase academic achievement and sustain learner motivation (cf. Kusrkan, Cate, Vos, Westers, & Croiset, 2012; Alyami et al., 2013; Fahlvik, 2013; Witney & Wei, 2013; Feledichuk & Wong, 2014; Abeysekera & Dawson, 2015). Hence, the present research seeks to determine the extent to which flipped learning improves college students' (a) academic achievement and (b) motivation to learn.

Statement of the problem:

Specifically, this study was intended to answer two research questions:

Q1. To what extent does flipped learning improve academic achievement ?

Q2. To what extent does flipped learning improve motivation to learn ?

With respect to both questions, it is hypothesized that no statistically significant differences will be identified at the .05 level of confidence between the mean scores of students, regardless of their exposure to flipped teaching.

Methodology

Study Design

A quasi-experimental design was employed wherein pre- and post-tests were administered to nonequivalent groups. Two separate sections of a fourth level preparatory course for elementary English teachers at Princess Nourah bint Abdulrahman University in Riyadh, Saudi Arabia were designated as control and experimental groups. The use of flipped in place of traditional instruction (i.e., face-to-face lecturing) was the independent variable, whereas achievement test performance and motivation scale responses before and after treatment functioned as dependent variables. There was no indication prior to commencing the experiment that either group differed significantly in terms of any variables related to the study. However, a pre-test was administered to both groups before commencement of the treatment.

Participants and Procedure

The experimental group comprised 40 students while the control group comprised 36 female students respectively, whose median age was 21. A preliminary meeting was held in order to explain the purpose of the experiment, and additionally, the participants signed an agreement to obtain informed consent. Prior to the experiment, a pre-test was administered to control for differences between both groups. Links to videos were posted on the course website, which members of the experimental group were directed to view before each class meeting, the participants of the experimental group had been exposed to the flipped classroom throughout the semester (4 months). While the control group received face-to-face lecturing, the students in this group used to do their assignments and research at home. The achievement test (identical pre-post test) comprised 30 multiple-choice questions pertaining to materials that were covered during the course: Teaching Young Foreign Language Learners that was one of the courses for preparing the elementary English teacher; motivation scales in questionnaire form were used to assess learning motivation, which were adopted from Shia's (1999) Academic Intrinsic Motivation Scale, and the Center of Inquiry at Wabash College's (2009) Academic Motivation Scale.

To ensure the validity of the instruments, the following measures were taken: the pre-posttest was reviewed by a group of jury members of the same major: senior professors of education (Curriculum and English Language Methodology). Accordingly, some modifications were made to the pre-posttest. To assess the reliability of the pre-posttest and motivation scales, they were administered to students in a pilot sample before the experiment was conducted. The Kuder-Richardson-20 formula was applied to the data and the reliability level of the pre-posttest (achievement test) was 0.50, which is statistically reliable. Meanwhile, Cronbach's formula was applied to the first Academic Intrinsic Motivation scale and the reliability level was 0.83, which proved to be statistically reliable. The reliability level for the second Academic Motivation Scale was 0.65, which also proved to be statistically reliable.

The experimental group members were the subjects of flipped learning. They viewed the videos at home, while class time was spent on the following active learning activities: discussions regarding the course topics; problem-solving, where the participants were given some scenar-

ios in problem form to solve; conducting interviews with their peers about the topics covered; presenting some issues and giving their positions and evaluation; analyzing some articles and situations about learning and teaching; and applying peer and self assessment. Meanwhile, the control group participants were taught by using lectures and discussions.

Analysis

To determine the equivalency between groups prior to commencing the experiment, *t* tests were applied to the mean scores of the pre-test results and motivation scale responses. Likewise, *t* tests were applied to the post-test results and motivation scale responses in order to assess whether the experimental group achieved any gains following the treatment.

Results

Results of the statistical analysis of both groups in academic achievement, and students' grades in both motivations prior to treatment scales before the commencement of the experiment. The mean scores of the experimental and control groups respectively were 36.42 and 34.26, with a *t* value of 0.96, which is not statistically significant at the .05 level. Hence, according to the pre-test results, there was no statistically significant difference between either group in terms of achievement (see Table 1).

Table (1)
T-test Results of Both Groups' in the Academic Achievement Pre-test Achievement Scores

Group	N	M ^{a*}	SD	t- value	Sig.
Experimental	40	36.42	8.21	0.96	0.340
Control	36	34.26	11.29		

Note. ^aAverages were converted into 100 degrees.

Academic motivation prior to treatment. The mean scores of the experimental and control groups for the first motivation scale were 3.46 and 3.54 respectively, with a *t* value of 0.60, which is not statistically

significant at the .05 level. As for the second motivation scale, the mean scores were 3.82 and 3.67 for the experimental and control groups respectively, with a t value of 1.10, which is not statistically significant at the .05 level. Hence, there were no statistically significant differences between either the two groups in terms of motivation (see Table 2).

Table (2)
T-test Results for Both Groups' Pre-test Motivation Scores

Scale	Group	N	Ma	SD	t value	Sig.
1	Experimental	40	3.46	0.58	0.60	0.554
	Control	36	3.54	0.52		
2	Experimental	40	3.82	0.64	1.10	0.276
	Control	36	3.67	0.52		

Note. ^aAverages were converted into 5 degrees.

Academic achievement following treatment. To answer the first research question (i.e., to what extent does flipped learning improve academic achievement) and address its null hypothesis (i.e., that no statistically significant differences would be identified), a t test was applied to the post-test scores. The mean scores of the experimental and control groups were 50.08 and 40.93 respectively, with a t value of 3.70, which is statistically significant at the .01 level (see Table 3). Eta squared (η^2) value or the effect size across both groups is 0.16.

Hence, the null hypothesis was rejected in this case since the flipped approach resulted in enhanced academic achievement in the experimental group.

Table (3)
T-test Results for Both Groups' Post-test Achievement Scores

Group	N	M ^a	SD	t value	Sig.	Eta
Experimental	40	50.08	11.23	3.70	0.000 (0.01)	0.16
Control	36	40.93	10.25			

Note. ^aAverages were converted into 100 degrees.

Academic motivation following treatment. To answer the second research question (i.e., to what extent does flipped learning improve motivation to learn) and address its null hypothesis (i.e., that no statistically significant difference would be identified), a *t* test was applied to the post-treatment motivation scale responses. The mean scores of the experimental and control groups for the first motivation scale were 3.51 and 3.24 respectively, with a *t* value of 2.00, which is statistically significant at the .05 level. As for the second motivation scale, the mean scores were 3.46 and 3.23 for the experimental and control groups respectively, with a *t* value of 2.00, which is statistically significant at the .05 level, (see Table 4). Hence, the null hypothesis was rejected in this case as well, since the flipped approach resulted in enhanced motivation for the experimental group.

Table (4)
T-test Results for Both Groups' Post-treatment Motivation Scale Responses

Scale	Group	N	Ma	SD	t value	Sig.
1	Experimental	40	3.51	0.54	2.00	0.049 (0.05)
	Control	36	3.24	0.65		
2	Experimental	40	3.46	0.48	2.00	0.050 (0.05)
	Control	36	3.23	0.56		

Note. ^aAverages were converted into 5 degrees.

Discussion

This study determined that flipped learning had a positive impact on academic achievement and motivation. Its findings are largely consistent with those of Marlowe (2012), as well as Feledichuk and Wong (2014), who both reported increases in average grades following the approach's implementation. Moreover, as this study's participants were college students, it also corroborates the findings of Butt (2012), who highlighted the usefulness of flipped learning in a university context due to its integration of activities with demonstrations. Likewise, Davies, Douglas, and Ball (2013) emphasized the effectiveness and

scalability of technology-enhanced flipped learning in a college environment, specifically in terms of motivation and differentiation of instruction. Indeed, according to O'Flaherty and Phillips (2015), a significant amount of indirect evidence is emerging to suggest that flipped learning improves academic performance as well as student and staff satisfaction in higher education contexts. As for the present study, most students preferred the interactive class time when they were involved in different activities. Some students admitted that this model "Flipped classroom approach" made them more motivated.

In the present study, flipped learning resulted in greater student-student and student-instructor interaction. During class, pupils were given opportunities to partake in discussions and problem solving activities with their peers, thereby affording students greater responsibility over their learning. Flipped classrooms provide a legitimate platform for differentiation, and can be adapted to meet students' needs regardless of their academic prowess. Since lectures do not occur during class in flipped courses, instructors can address the needs of students individually, including those of students who may be struggling to understand certain concepts. For instance, some students consumed a long time while doing the activities, like comparing and analyzing certain educational terms in their course. A few students found it challenging to give their position regarding the videos they were watching. Consequently, the flipped classroom model helped the instructor to spend more time directing those struggling students.

Participants in this study appreciated the integration of direct instruction with the use of technology at home, which enabled learners who were absent from class to remain up to date with course content. Recorded lectures also allowed pupils to review lessons as often as needed, regardless of time or place. This versatility in consuming content provided students with greater time to contemplate the course materials, and consequently pose questions concerning them during classroom activities and discussions.

Due to its unique nature, foreign language instruction requires innovative teaching approaches. The foreign language learners in this study were generally satisfied with the flipped classroom model. Despite these perceived shortcomings which were related to the students' learning preferences and their desire to have face -to-face lectures with

the instructor and to get immediate feedback, flipped learning has demonstrated success in EFL contexts. Feledichuk and Wong (2014) examined academic achievement between native and non-native speakers in both flipped and traditional classrooms. Learners in the flipped classrooms reported higher gains than their traditional counterparts; more interestingly, however, non-native speakers demonstrated greater improvement than did their native-speaking peers (by 13.23% and 10.85%, respectively). Likewise, the results of Hung's (2014) study revealed that students from either the structured or semi-structured flipped classrooms were stimulated to become more active in learning due to flipping learning.

In sum, the role of the prospective teacher has changed dramatically in recent years due to the emergence of numerous advanced technologies. The inherent possibilities of the flipped approach as a means to transform learning experiences through the use of technology and active learning strategies is evident (particularly among college students in an EFL context), and therefore must be explored to its fullest potential.

Conclusion

This study examined the impact of the flipped classroom approach on the academic achievement and motivation of students attending a university-level preparatory program for EFL instructors. In addition to investigating motivation and achievement, the author hopes that this experiment would enhance understanding of the course materials among participants, and also increase their engagement in the learning process. Given the results obtained, it appears that some progress was achieved in both respects.

Effective flipped learning implementation requires careful planning by both the instructor and his or her students; this entails considering environmental, technological, and personal factors. As this research was conducted, several limitations and complications became apparent. For instance, approximately 1/6 of the students (6 students of the 40) frequently was not anxious to view the assigned videos prior to class despite the Internet connectivity was reliable to them. When discussing this issue with them, they claimed that they preferred face-to-face lectures to watching videos at home and they gave the following

reasons: direct lectures keep them alert, they have the chance to ask questions immediately, and they can obtain direct feedback from their peers. Meanwhile, they preferred interactive class time to in-person lectures. In such cases, these individuals watched the lectures during class time, and were therefore unable to participate in or benefit from in-class activities or discussions. Furthermore, the university's Internet connectivity was unreliable, thereby preventing students from accessing resources that could have assisted them in completing in-class activities. However, the researcher could manage this difficulty by providing mobile Wi-Fi devices to proceed with the class activities. Also, the students who were living in campus housing (three students only) had been given the mobile Wi-Fi devices to gain Internet access.

The study's findings are in agreement with most recent research concerning flipped classrooms, wherein significant increases in student achievement and motivation were observed. Nevertheless, it should be stated that whereas some students are capable of learning independently, others may require direct, face-to-face instruction in order to comprehend certain concepts. Hence, teachers must exert discretion in choosing the most appropriate approaches to content delivery. Future research should more thoroughly investigate how professional development should be modified in order to assist instructors accustomed to traditional teaching with the implementation of flipped learning in their classrooms.

أثر التعلّم بنظام الصف المقلوب على التحصيل الأكاديمي ومستوى الدافعية لدى طالبات كلية التربية (مسار معلمة اللغة الإنجليزية)

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الملخص

هدفت هذه الدراسة شبه التجريبية للكشف عن أثر التعلّم وفق استراتيجية الصف المقلوب على التحصيل الأكاديمي ومستوى الدافعية لدى طالبات كلية التربية (مسار معلمة اللغة الإنجليزية). تكونت عينة الدراسة من ٧٦ طالبة في المستوى الرابع في برنامج إعداد معلمة اللغة الإنجليزية للمرحلة الابتدائية. أما الأدوات المستخدمة في هذه الدراسة فقد شملت: اختبار التحصيل الأكاديمي في مقرر تدريس اللغة الإنجليزية للصغار وهو من تصميم الباحثة، واستُخدم كاختبار قبلي وبعدي للمجموعتين التجريبية والضابطة، بالإضافة إلى مقياسي دافعية الطلاب اللذين تبنتهما الباحثة، وهما: مقياس الدافعية الأكاديمية الذاتية Academic Intrinsic Motivation Scale (Shia, 1999)، ومقياس الدافعية الأكاديمية Academic Motivation Scale (Center of Inquiry at Wabash College, 2009).

وأشار تحليل النتائج إلى تقدّم طالبات المجموعة التجريبية بالمتوسط الحسابي ٥٠,٠٨ على المجموعة الضابطة وحصلت على متوسط ٤٠,٩٣ في اختبار التحصيل الأكاديمي البعدي حيث بلغت قيمة ت ٣,٧٠ عند مستوى دلالة ٠,٠١. أما فيما يتعلق بمستوى الدافعية حسب المقياس الأول فجاءت المتوسطات الحسابية ٣,٥١ للمجموعة التجريبية و ٣,٢٤ للمجموعة الضابطة وكانت قيمة ت ٢,٠٠ عند مستوى دلالة ٠,٠٥. كما جاءت المتوسطات الحسابية عند تطبيق مقياس الدافعية الثاني ٣,٤٦ للمجموعة التجريبية و ٣,٢٣ للمجموعة الضابطة وقيمة ت كذلك ٢,٠٠ دالة عند مستوى دلالة ٠,٠٥. إذن أظهرت نتائج الدراسة وجود فروق ذات دلالة إحصائية تُعزى لاستخدام نظام الصفوف الدراسية التفاعلية لصالح المجموعة التجريبية في كل من اختبار التحصيل الأكاديمي، ومقياسي الدافعية.

وتُعَدّ الدراسة الحالية ضمن الدراسات القليلة على حد علم الباحثة وحسب البحث في قواعد البيانات الأجنبية - التي تطلّقت إلى موضوع الصفوف التفاعلية في مجال تدريس الإنجليزية كلغة أجنبية والتي تناولت الطالبات المعلّمت كمجتمع للدراسة.

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