International Journal of Language and Literary Studies
Volume 3 , Issue 2, 2021
Homepage : http://ijlls.org/index.php/ijlls

Exploring the Effect of the Flipped Classroom Model on EFL Phonology Students' Academic Achievement

Mohsine Wahib
Ibn Zohr University, Morocco
m.wahib@uiz.ac.ma

Youssef Tamer
Ibn Zohr University, Morocco
y.tamer@uiz.ac.ma

DOI: http://doi.org/ 10.36892/ijlls.v3i2.581

Received:
06/05/2021

Accepted:
16/06/2021

Keywords:
Flipped Classroom Model, Academic Achievement, EFL Phonology, Edpuzzle

Abstract

Recent research has shown that the flipped model had a great success in higher education. Yet, there are very limited experimental studies that prove its effects on EFL students' academic achievement in Moroccan higher education. The central objective of this paper is to investigate the effectiveness of the flipped model in an EFL Phonology course and its effect on students' academic achievement. The sample was composed of 156 participants (n=156) of two intact groups of EFL phonology course at two Moroccan higher education institutions. In a semester-long study, the phonology course was taught using the flipped model. Working with the existing intact classrooms made the study adopt a quasi-experiment design. The teacher inverted the course by offering lectures via videos for students to view at home using the free online platform Edpuzzle and then followed up by providing activities and more practice in the classroom. Quantitative data were gathered using self-designed achievement test as a pre-test and post-test for both control and experimental groups. The results revealed a significant increase in the participants' academic achievement in the experimental group in comparison to the control group.

1. INTRODUCTION

The integration of educational technologies in different school settings is fast becoming a key instrument in the educational reform in Morocco. The need to integrate technology in the classroom has always been a primary concern in order to improve the quality of learning and instruction since the issue of the National Charter of Education and Training of 1999 (Mimouni et al., 2020).The national strategic vision 2015-2030 of the Moroccan educational reform has emphasized and highlighted the importance of technology integration in improving the quality of curricula and programs at all educational levels of schools and higher education (The Supreme Council for Education, Training, and Scientific Research [CSEFRS], 2015). It is highly recommended that our country's educational system must take into account the prosperity of the digital revolution that is shaping our students' life and the global economic development nowadays. It must be noted in this regard that the Moroccan higher education, in particular is in need of a new model that inspires innovative educational practices with new technologies and ways of organizing education. The council suggests implementing new teaching patterns that combine the classical lecturing classes,

online-based learning, and students' personalized work as new innovative models of learning (CSEFRS, 2019). Therefore, it has become obvious that what would constitute the model for future higher education institutions is their heavy influence of educational digital technologies.

Moroccan researchers and teachers have recently shown an increased interest in the flipped classroom model (FCM). Since the use of technology is an integral part of FCM, the availability of the digital resources has made it possible for Moroccan teachers of different courses to adopt the flipped method. The model simply seems to be about videos taking the role of the teacher to be watched at home and about more available time for students during class (Logan, 2015). However, it has been reported by one of the Moroccan pioneers in the implementation of the FCM in Moroccan universities that "the method is very challenging and requires the teacher to be a subject-matter expert, master Flip pedagogy, and be conversant with the basics of developing digital learning resources" (Bensoukas, 2016, p. 86).

The flipped classroom model could be the appropriate teaching model for reengaging students whose motivation has been hijacked by the influence of technology and who no longer possess the desire to complete assignments at home or who cannot attend classes regularly. However, little is known about the effectiveness of this model in the Moroccan classrooms in general and far too little attention has been paid to its effects on Moroccan EFL students' academic achievement in particular. Therefore, this study attempts to investigate the effectiveness of the FCM in the Moroccan university EFL context through examining the effects of this model on EFL students' academic achievement.

2. REVIEW OF LITERATURE

Students' academic achievement has always had increasing attention in educational research. Most educational research focus on the effects of certain variables on students' academic achievement. One of the first common questions that is frequently raised by instructors while experimenting a certain teaching approach is how excellent or how bad students perform under this approach. To answer this question, this requires a need to be explicit about exactly what is meant by the academic achievement.

According to Sarkar et al. (2017), students' academic achievement is about the level of knowledge and skills acquired in the course that is usually explored by test scores. For them, academic achievement is about nothing but the outcome of students' learning and about whether students have reached their educational goals and the course objectives (Sarkar et al. 2017). However, it is also noted that it can include other elements beyond the scores such as: behavior, punctuality, communication skills and self-confidence (Ganai & Mir, 2013). Academic achievement is a broad term that generally "incorporates a broad range of educational outcomes from degree attainment to moral development" (York et al., 2015, p. 1). For this reason, in this study academic achievement is defined as the level of mastery of skills and knowledge acquired in the phonology course based on numeric grades obtained in the summative test according to the Moroccan university standards. The individual student' academic achievement is measured by the obtained scores of the standardized achievement test assessment assigned by the teacher (Steinmayr et al., 2015).

One of the most worth-pointing out key benefits of the FCM is the positive effects it has on students' academic achievement as indicated by a wide array of research (Bormann, 2014; Giannakos et al., 2014; Karagöl & Esen, 2019). In a quasi-experimental study that aimed to investigate the impact of the flipped classroom on the eleventh-grade female students' academic achievement in new SAT mathematic skills, Diab (2016) compared between the scores of two groups (experimental and control) to determine any statistical significant difference. The findings revealed a statistical significant difference among the experimental group achievement scores over the control group (Diab, 2016). These results

suggested that the FCM could be used by math teachers to improve students' performance and thinking skills (Diab, 2016).

Butterick (2017) conducted a study that focused on examining the effect of using the FCM on the academic grade of ninth grade students with specific learning disabilities (SLD) in Algebra I class. The participants were five SLD students whose achievement was examined on daily assessments throughout the course using a single subject design with ABAB phases (Butterick, 2017). Results of the daily assessments showed that the participants' scores increased during each intervention of the flipped model. These results indicated that the flipped model could be an effective approach for improving academic scores among high school students. In addition, it is suggested that the flipped classroom might help students with specific learning disabilities to improve their learning achievement and performance (Butterick, 2017).

An action research at a public school took place in Physical Education, Mathematics and Science classrooms to investigate the impact of the flipped classroom model on students' academic achievement. Participants were eighth grade students in both middle and high school levels. In this study, Jundt, Moormann, Voorhees, and Ziemann, (2015) collected the data through a pre-assessment, written assignments, students' behavior checklist and post-assessment survey along a period that lasted seven classes for each course. To ensure a valid data, Jundt et al. (2015) allowed students to experience both the traditional format and the flipped format of teaching by the same teacher. Findings indicated that the majority of students exhibited a high level of task proficiency and a very good level of assignment completion along with being very successful in mastering the course content. Jundt et al. (2015) suggested that the flipped classroom experience was very positive and might not be good for every class, but it could be beneficial in enhancing students' academic achievement.

Another study by Elian & Hamaidi (2018) was conducted in Jordan in the subject of science among fourth grade students. The study aimed to explore the effects of using the FCM on the academic achievement of fourth grade science students. Following the quasi-experimental design, the sample was divided into two groups: an experimental group using the flipped classroom strategy and a control using the traditional learning model. After statistical calculations of ACNOVA, means and standard deviations, findings revealed that students in the FCM scored higher in their academic achievement test than those enrolled in the traditional model. The researchers concluded that the flipped classroom strategy could be an effective teaching approach in improving students' academic achievement in science classes (Elian & Hamaidi, 2018).

On the other hand, there are other studies that indicate no significant difference in students' academic achievement (Faretta, 2016; Vang, 2017). For example, a study done by Vang (2017) in a suburban high school in the central valley of California investigated the impact of the FCM on mathematics students' academic performance and self-efficacy. This quasi-experimental design study was conducted in four high school classrooms along 17 weeks on 60 eleventh and twelfth grade students. Thirty-four students were taught under the FCM as experimental group and twenty-six taught were under the traditional model as control group. To explore any significant difference in students' academic achievement between the groups, the researcher implemented a series of ANCOVAs to compare between the obtained scores in the four tools of measurement used, the post-test and three unit exams. The statistical results among all four measures indicated that there was no significant difference in the scores. This, as explained by the researcher, could have been caused by the fact that the flipped model is a new teaching method that requires a great amount of time and effort to get used to it. Additionally, the lack of a significant difference in students' achievement could have been affected by the lack of discipline to the new technology-based instruction that was difficult for most of students (Vang, 2017).

Faretta (2016), in her causal-comparative study in the Midwest United States, adopted the FCM in a pathophysiology course along 8 weeks. The objective was to investigate the effects of the flipped classroom on nursing students' academic performance and sense of class community. The study implemented a quasi-experimental pre-test- post-test non-equivalent control-group design to provide important evidence for the usefulness and efficacy of the flipped classroom on nursing students' achievement. The scores of the 100 multiple-choice questions final exam of the two groups were statistically compared. The independent t-test findings indicated that no significant difference was found between the means of the control group and the experimental group. These results revealed that nursing students who enrolled in the flipped classroom had similar academic performance as their peers in the other traditional class. Faretta (2016) concluded that the lecture classroom model and the flipped classroom model are both equally effective in their positive effects on students' academic achievement.

Another study that indicated no significant difference in students' academic achievement between the flipped classroom and the traditional one was the study of Holik (2016). The latter integrated the flipped classroom in a Culinary Arts course with a total sample of 24 students in a Technical Education program. To measure the differences between students' achievement in both classrooms, "course grade data" was used to compare between students' semester grades. As a result, the grades were reported to be 4% higher than the grades of students in the traditional classroom. However, the statistical analysis of the scores revealed that the scores obtained by students in the FCM, as compared to the ones from the traditional group, had no statistical significant difference (Holik, 2016).

In their review of the flipped classroom model, Giannakos, Krogstie and Chrisochoides (2014) examined thirty-two peer-reviewed articles which vary in terms of their subject area, sample size, educational level, instruments and research design. Their findings revealed six common key benefits regarding the adoption of the FCM. The first ranked benefit was the positive effects that the flipped model has on students' academic achievement. According to them, it was concluded that the improvement in students' academic achievement stems from the access they have to the course material like the flipped video lessons, their ability to control their learning at the pace they want and the fact that they enjoyed being able to learn independently whenever and wherever they like (Giannakos et al., 2014).

Another literature review of more than thirty peer-reviewed journal articles was conducted by Bormann (2014). The data collected was of a sound research methodology combining mixed-methods studies and quantitative studies that targeted different levels of students (secondary, undergraduate and graduate). All of these reviewed articles focused on the impact of using the FCM on students' engagement and academic achievement. According to Bormann (2014), "all studies that tested what effects a flipped environment can have on student achievement saw an increase. Some studies saw insignificant increases while others were more significant." (p. 26). Despite the different measurements used in these articles, their findings generally indicated that the FCM can be an effective teaching method that could provide students with an engaging environment which positively affects students' achievement. This review attributed the increase of students' academic achievement in these articles to two major factors: the video lectures and the in-class activities.

Recently, Karagöl and Esen (2019) conducted a study in which they reviewed fifty-five published studies as peer-reviewed articles in scientific journals, master's and doctoral theses written in both English and Turkish. The aim was to investigate the impact of the flipped classroom model on students' academic achievement. All the reviewed research was experimental in which participants were taught under the flipped learning approach in the experimental group while others were taught using the traditional learning model. Using random effects model in analyzing the results and the effect size of the studies, the findings

revealed that the impact was moderate reaching d= .566 according to Cohen et al. (2007). Karagöl and Esen (2019) concluded that the FCM is an effective teaching approach that might positively affect students' academic achievement better than the traditional model. For them, this positive effect can be attributed to several factors such as the responsibility that students take in the flipped learning environment, students' ability to learn according to their style and pace, students' engagement in a more active and collaborative learning environment and thanks to the high level of motivation that students demonstrate in the flipped learning environment. In this overview, it was also concluded that the flipped classroom is found to be more effective in terms of increasing students' academic achievement when the period of its implementation is between 1-4 weeks and less effective when it exceeds 9 weeks (Karagöl & Esen 2019).

3. METHODOLOGY

It is highly believed among Flipped Learning researchers and educators that the flipped classroom model plays an important role in learners' achievement through its significant decrease of lecturing and a considerable increase of active learning along the course (Baker, 2000; Bergmann & Sams, 2012). This makes learners focus not on remembering but more on understanding and application which in turn results in promising achievements (Baker, 2000). The Flipped Learning Network (FLN) reported that among the 453 teachers who flipped their classrooms in 2012 67% confirmed an improvement and increase on students' tests scores (FLN, 2014). This belief suggests that the implementation of the flipped model in Moroccan universities EFL courses may lead to positive results regarding students' achievement.

Therefore, this is study aims to answer the following questions:

Research Question: Does the flipped classroom model affect students' academic achievement in the EFL phonology course?

Seeking to answer this research question, the following null hypothesis is put forward:

H10: There is no significant difference in academic achievement between EFL phonology students in the flipped classroom model and those in the traditional class.

H1a: There is a positive significant difference in academic achievement between EFL phonology students in the flipped classroom model and those in the traditional class.

3.1. Research Design

The purpose of this study was to investigate the effects of the flipped classroom model on EFL phonology course students' academic achievement in the flipped phonology course. The study adopted a mixed-methods approach with multiple research instruments collecting data using pre-test and post-test for achievement, pre-test and post-test MSLQ questionnaire for self-regulation (Pintrich et al., 1991), and a follow-up survey for students' perceptions.

A quasi-experimental design was highly required for this study for its substantial help it provided to obtain a representative data with a more comprehensive interpretation than what one type of data alone might provide (Moran, 2014). Both quantitative data and qualitative data collection were combined due to the quantitative and qualitative hybrid nature that is inherited in the present study's research questions.

Working with the existing intact classrooms made the study adopt a quasi-experiment design; and since the study investigated two intact groups of EFL Phonology groups, it has opted for the non-equivalent control group design (Gay et al., 2011). This design is very much similar to pre-test post-test control group design, except in the fact that the former involves random assignment of intact groups to treatment; while the latter involves a random assignment to individuals (Gay et al., 2011).

The dependent variable under which the two groups were measured was the improvement of students' achievement from the pre-test to the post-test (O1) after the treatment phase. The independent variable (X) here is the flipped learning model which was implemented in the phonology course throughout a one-semester long experiment during exactly eight sessions. This design takes the following form:

O1 X1 O1

O1 X2 O1

Table 1.

The Form of the Research Design Table

Groups	Achievement Pre-test	Treatment	Achievement Post-test
Experiment Group	O1	X1	O1
Control Group	O1	X2	O1

To address students' achievement in the flipped phonology course model, a quasi-experimental research design was conducted using the pre-test post-test control group design (Gay et al., 2011). Quantitative data were collected in a pre-test to assess students' achievement before the treatment phase of the study. In the one-hour pre-test, students of the two groups were required to work on five exercises targeting main sections of the phonology course. The treatment phase was the implementation of the flipped classroom model in the phonology course for the experiment group for approximately two months in a one-semester long study.

The period of this study lasted 8 weeks. It was suggested that the implementation of the flipped classroom model is more effective between 1-4 weeks and less effective when it exceeds 9 weeks (Karagöl & Esen, 2019). Students of the experiment group attended eight sessions, five of which were flipped. At the end of the treatment, the same test was administered again as a post-test. The control group was taught the same phonology course content during eight sessions using the traditional method with a lecture-based approach that is used in most of other university courses. The control group also sat for a one-hour post-test that was similar to the test they had before the treatment and similar to the test that the experiment group had.

3.2. Participants

The target population to which this study wanted to generalize its findings is EFL phonology students in Morocco (Gay et al., 2011). The accessible population from which subjects were selected is composed of two intact groups of an EFL phonology course at two Moroccan university institutions, the faculty of letters and human science in Agadir and the faculty of languages, arts and human sciences in Ait Melloul. The sample population for this research included students enrolled in their sixth semester in an EFL phonology course at these two university institutions. Participants were composed of both males and females. The sample was composed of 156 participants (n=156) derived from participants who were considered as highly committed to the flipped phonology course. The two samples were selected based on criteria of attendance, phonology background, watching video lessons and having taken both the pre-tests and post-tests. So, since the samples were derived from the intact groups on this basis, students with little or no commitment to the aforementioned criteria were eliminated and both their pre-tests and post-tests were discarded.

3.3. Research Instrument

The achievement test used in this study is a self-developed test deigned to assess the dependent variable achievement. The test was developed according to the course objectives measuring all aspects of phonology which were set as fundamental components of the course. The content validity was evaluated to appropriately address the intended content area of the phonology course (item validity). Besides, the sampling validity of the test items was thoroughly examined to sufficiently cover relevant content area (Gay et al., 2011).

The alignment of the test' items with the course specifications and objectives helped in the construction of a reliable instrument that would guarantee reliable results (Gay et al., 2011). In the same vein, and for more validity and reliability, the test was first pilot tested to 8 EFL phonology students from a non-participant group similar to the actual intact groups used in the study. The pilot test helped in refining the test items used by avoiding confusing wording sentences, using appropriate vocabulary, adding examples of the desired answer for some items, and adding other sub-items for content validity.

To avoid any threats to the experimental validity, the pre and post achievement tests were purposefully meant to be identical. According to Gay and his colleagues (2011), two different tests may cause an inconsistent measurement and may bring about invalid assessment of the students' performance which would eventually threaten the internal validity of the instrument. In other words, "if the posttest is more difficult than the pretest, improvement may be masked. Alternatively, if the posttest is less difficult than the pretest, it may indicate improvement that is not really present" (Gay et al., 2011). Therefore, the use of two identical tests may result in an accurate measurement and valid results. Besides, the pre-test effect is unlikely to be a threat in this study since the time between the pre-test and the post-test was sufficiently long (Gay et al., 2011).

3.4. Research Procedure

Before the start of the phonology course and after receiving both the consent form, both experiment and control groups sat for a pre-test. Before the start of the test, the researcher provided clear explanations of the exercises and plain instructions on how to answer. The participants took the test in unified settings in a duration of one hour and a half. The test had supply items related to the main five sections of the phonology course that students had to respond to. The main objective was to assess their prior knowledge of phonology and their performance in the course and to check whether the two groups had the same level at the starting point of the experiment.

The post-test was administered to the participants in unified settings immediately after the treatment. The participants were asked to respond to the five exercises of the phonology achievement test addressing the five sections which were covered throughout the course. The duration of the post-test was one hour and a half exactly as the pre-test's. The main objective of the post-test was to reveal any noticed progress of students' achievement by the end of the experiment and to discover the difference between the two groups' mean scores that would reveal any potential positive or negative effects of the treatment.

3.5. Data Analysis Procedures

In order to explore the effect of the flipped classroom model on Moroccan EFL phonology students' achievement, participants' pre-tests and post-tests were scored using a self-developed based on the alignment of the main objectives of the course with the main sections of the test and on the basis of valid criteria. After the self-development of the scoring rubric, it was shared with experienced educators in the field of theoretical linguistics seeking feedback on its validity. As a result, noteworthy comments were received that helped in improving the scoring rubric.

The scoring stage was executed by the researcher and other two experienced Phonetics and Phonology raters. The three raters followed a unified scoring criteria set after pilot-testing the instrument. The tests were independently scored in a confidential manner that would guarantee a high level of reliability. Therefore, Intraclass Correlation Coefficient (ICC) tests were used to check inter-rater reliability levels. The received overall scores of each student from each of the three raters on the two tests were computed into SPSS to verify the inter-rater reliability. Two ICC tests were used to investigate inter-rater reliability on pre-test scores as well as post-test scores. The statistical results of the two ICC tests used indicated that the degree of inter-rater reliability was significantly excellent at the level of pre-test scores (ICC=0.931>0.5). As for the post-test scores, the degree of inter-rater reliability was significantly very good (ICC=0.821>0.5).

Finally, the scoring data gathered from the two pre-tests and post-tests of the two groups were subject to statistical analysis using a set of independent samples t-tests and paired samples t-tests to compare between the scores of participants' pre-tests and post-tests and measure the significant difference between the two groups' mean scores.

4. RESEARCH RESULTS

For the analysis of the students' achievement at the two points of measurement, all tests scores were inserted according to students' ID numbers assigned in the software. Then, a set of t-tests were implemented to present the results before and after the experiment between (paired samples t-tests) and within the two groups (independent samples t-tests). Finally, all the t-tests were conducted at the level of (.05).

To compare the mean scores of the two groups on the pre-test, an independent Samples t-test was used. The results of this test, as shown in the first table below, highlight sample sizes (N), mean scores (M) and standard deviation (SD). The second table displays results on the mean Difference (MD) and any significant statistical difference (P value) between the experimental group and the control group in the post-test.

Table 2

Group Statistics of the Achievement Pre-test Scores

	Group	N	Mean	Std. Deviation	Std. Error Mean
Pre-Test Results	Control	78	2,0854	1,90646	.21053
	Experimental	78	2,6090	2,06493	.23381

Table 3

Independent Samples Test on Achievement Pre-test Score

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Pre-Test Results	Equal variances assumed	.002	.967	-1,668	158	.097	-.52361	.31400
	Equal variances not assumed			-1,664	155,381	.098	-.52361	.31463

The statistical results of the pre-test scores indicate that the initial level of phonology students' achievement between the control group and the experimental group is roughly similar . As revealed in the first table above (Table 2), the two groups got approximately similar scores on the pre-tests. The mean score of the control group is (Mc= 2.0854) while the mean score of the experiment group is (Me= 2.6090). Besides, the second table demonstrates that there is no significant statistical difference between the mean scores of the two groups (MD= 0.523, t= 1.668, p= 0.097 > 0.05) (see Table 3).

The second Independent Samples Test was meant to analyze the inter-group mean difference of participants' scores on the post-test. The results of this test, as shown in the first table below, highlight sample sizes (N), mean scores (M) and standard deviation (SD). The second table displays results on the mean Difference (MD) and any significant statistical difference (P value) between the experimental group and the control group in the post-test.

Table 4

Group Statistics of the Achievement Post-test Scores

	Group	N	Mean	Std. Deviation	Std. Error Mean
Post-Test Results	Control	78	8,0122	3,14464	,34727
	Experimental	78	10,4487	4,16509	,47160

Table 5

Independent Samples Test on Achievement Post-test Scores

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Post Test Results	Equal variances assumed	7,788	,006	-4,189	158	,000	-2,43652	,58164
	Equal variances not assumed			-4,160	143,136	,000	-2,43652	,58567

As it is indicated in the statistical results above (see Table 4), the mean score of the experimental group on the post-test is (Me= 10.4487). The latter, as obviously described, is significantly higher than that of the control group (Mc= 8.0122). The results of the Independent Samples Test prove that the mean difference (MD= 2.436) of participants' improvement between the control and experimental group is statistically significant (t= 4.189, df= 158, p= 0.00 < 0.05) (see Table 5).

After analyzing the inter-group differences in terms of the overall scores obtained in the pre-test and post-test, the difference between participants' scores in each group was also analyzed. The results of the analysis were meant to reveal intra-group comparisons as shown in the tables below.

To compare the mean scores of the pre-test and post-test of the participants of the control group, a paired Samples test was used. The results of this test, as shown in the first table below (Table 6), highlight sample sizes (N), mean scores (M) and standard deviation (SD). The second table displays results on the mean Difference (MD) and shows any significant statistical difference between the pre-test and the post-test in the control group (see Table 7).

Table 6

Paired Samples Statistics of the Control Group (achievement test)

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-Test	2,0854	78	1,90646	,21053
	Post-Test	8,0122	78	3,14464	,34727

The participants' achievement of the control group on the post-test was higher than that of the pre-test. As can be seen in the statistical results above, the mean score of the pre-test is (M= 2.0854), while the mean score of the pre-test is (M= 8.0122). Moreover, the mean difference (MD= -5.92683) between the two tests was statistically significant at (t=17.810, df= 81, p=0.000 < 0.05) (see Table 7).

Table 7

Paired Samples Test of the Control Group (achievement test)

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre-Test - Post-Test	-5,92683	3,01347	,33278	-6,58896	-5,26470	-17,810	81	,000

The second Paired Samples t-test was meant to analyze the intra-group mean difference of participants' scores on both the post-test and pre-test in the experimental group. The results of this test, as shown in the first table below, highlight sample sizes (N), mean scores (M) and standard deviation (SD) (see Table 8). The second table displays results on the Mean Difference (MD) and shows any significant statistical difference between the post-test and the pre-test in the experimental group (see Table 9).

Table 8

Paired Samples Statistics of the Experimental Group (achievement test)

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-Test	2,6090	78	2,06493	,23381
	Post-Test	10,4487	78	4,16509	,47160

Table 9

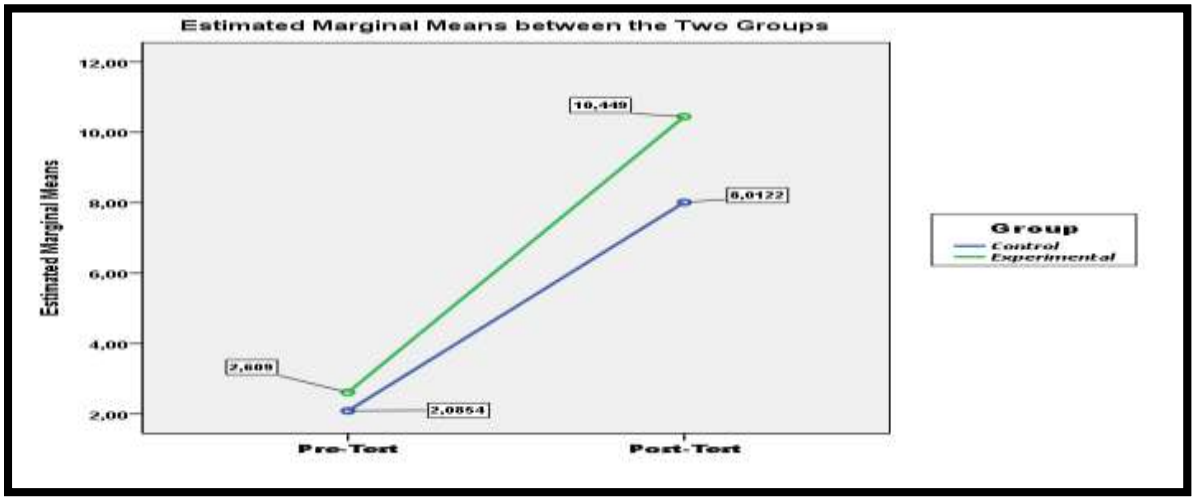
Paired Samples Test of the Experimental Group (achievement test)

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

Pair 1	Pre-Test - Post-Test	-7,83974	3,73861	,42331	-8,68267	-6,99682	-18,520	77	,000

The participants' achievement of the experimental group on the post-test was higher than that of the pre-test. As can be seen in the statistical results above, the mean score of the pre-test is (M pre= 2.6090), while the mean score of the post-test is (M post= 10.4487) (see Table 16). Moreover, the mean difference (MD= 7.83974) between the two tests was statistically significant at (t=18.520, df= 77, p=0.000 < 0.05) (see Table 9).

Figure 1. The Participants' Achievement Levels at the Two Points of Measurement



The statistical results of the t-tests comparing the two groups' overall scores on the pre-test and post-test generally indicate, as shown by the figure above, that the participants of both the control group and experimental group scored roughly the same on the achievement pre-test. Also, the figure shows that the two groups made a significant progress on their phonology achievement in the post-test. However, it is crystal clear that the experiment group scored significantly higher than the control group on the post-test.

5. DISCUSSION

Generally, the results obtained from all the tests that were conducted on the participants' overall scores on the pre-test and post-test proved, on the one hand, that the flipped classroom model had significant impact on students' phonology achievement at the experimental group by the end of the experiment. On the other hand, in comparison to the highly significant improvement in the experimental group, the control group students demonstrated a slight progress in their phonology achievement at the end of the study. It is therefore possible to assume that this study rejects the null-hypothesis that there are no significant differences in academic achievement between EFL phonology students in the FCM and those in the traditional class. Instead, the results provide further support for the alternate hypothesis that there is a positive significant difference in academic achievement between the two groups.

The results of these tests proved that it is applicable to improve EFL phonology students' skills, knowledge and achievement in phonology through the flipped classroom model. This study reports the same results of some recent research findings such as (Bergmann & Sams, 2012), (Love et al, 2013), (Quint, 2015), (Farah, 2014), (Al-Zahrani, 2015), (Syam, 2014), (Zappe et al, 2009), (Pierce, R. 2012) and (Jundt et al, 2015) which highlight the positive impact that the flipped model has on students' achievement. This stems

from the learner-centered approach that this model centers on and the collaborative learning environment it created during in-class time. The effectiveness of the flipped classroom model in improving phonology performance among EFL students in the experimental group could be attributed to the following factors:

In a traditional classroom, students would spend the whole or most of the class-time learning the information with no background knowledge that would help generate feedback or discussion (Jundt et al, 2015). In contrast, students in the flipped classroom model are found to be learning more than their counterparts in other traditional classrooms (Jundt et al, 2015). The success of students who enrolled in the flipped phonology course could be attributed to the fact that they came to class with more background knowledge about what they were going to study. The background knowledge triggered motivation and curiosity among learners to know more about the content before they got fully engaged working on more exercises. It was noticeable during sessions of the experimental group that the participants were very interested in the course thanks to their initial pre-conceived knowledge which they acquired through the flipped videos before class time. In every session, learners were coming up with questions that would initiate discussions on various points of the course content that would in turn reinforce their learning and comprehension. Through this process, students were able to learn effectively, develop their phonology knowledge and enhance their phonology skills.

The positive impact of the flipped classroom on the achievement of experimental group participants in phonology could be attributed to the extensive accessibility students had to the course content. This accessibility makes learners who are involved in the flipped model learn more than their counterparts in other traditional classrooms (Jundt et al, 2015). According to Bergmann & Sams, (2012), the success of the flipped classroom hinges on providing students with an extensive access to the content. Most of the flipped classroom model devotees argue that the recorded videos make best use of the in-class time for learners to effectively collaborate with their peers, to profoundly engage with the course content and to allow them immediately receive direct feedback from their teacher (Overmyer, 2014). In the flipped phonology course, students are able to stop their teacher and rewind him whenever is needed. Students are able to spend sufficient time reviewing and revising the most complicated sections in the course while watching the video lessons and again while practicing during in-class time. The learning of the course content could be personalised according to their pace and style of learning. Additionally, the flipped model allows students to discuss the details of the course content collaboratively for an extended period of time that enabled them to reach a deep comprehension of the course and recall its main components.

The success of students' achievement who enrolled in the flipped phonology course could be attributed also to the new role assigned to the teacher in the flipped model. Unlike in the traditional classroom, the adoption of the flipped model changes the role of the teacher from a passive lecturer to an active instructor who spends most of his class time walking around helping and guiding students who struggle with the course content (Bergmann & Sams, 2012). The teacher in the flipped phonology course does not spend his ninety minutes just presenting the content in front of his students. Rather, he is talking to his students, guiding them on the side, answering their questions, helping struggling learners, provoking discussions, and organizing and facilitating the whole learning process. The role of the teacher in the flipped phonology course is shifted completely from a lecturer to a tutor. Students work collaboratively under his sight to achieve better learning outcomes and do not show any sign of dependence on him as a source of knowledge. This way, students are able to learn effectively, develop their phonology knowledge and enhance their phonology skills.

Hamer (2001) stresses that it is imperative for students to take responsibility for their learning and teachers should work on improving that. The effectiveness of the flipped classroom model in improving phonology performance among FPC students could be also

attributed to the sense of responsibility they gain throughout the course. The flipped classroom could be effective in fostering students' sense of responsibility. In the study of Ceylaner & Karakuş (2018), the findings reveal that the flipped classroom model "seems to be managed on the basis of developing students' sense of responsibility" (p. 139). Based on the results of the current study, it could be claimed that the flipped classroom model does positively affect students' self-regulatory skills through increasing their abilities to monitor, manage and regulate their cognition, motivation and behavior. Perry (1998) reports that students are extremely motivated when they are autonomously in charge of their own learning and have the chance to control the level of challenge among their peers. The FPC students do not show any complete dependence on their teachers as a source of knowledge. Rather, they are more responsible, control their learning and have more choice self-pacing their learning through the flipped videos. In the FPC, the need of the teacher's help is decreased while responsible individualized learning is increased.

The improvement in the learning outcomes of students who enrolled in the flipped phonology course could be also attributed to the collaborative learning environment where classroom interaction is fostered. The classroom interaction occurs when there is an "interaction between the teacher and the learners, and amongst the learners, in the classroom" (Tsui, 2001, p. 120). Bergmann & Sams also argue that "One of the greatest benefits of flipping is that overall interaction increases: teacher-to-student, and student-to-student." (Bergmann & Sams, 2012, p. 27). Learning under the flipped phonology course provides students with opportunities to create an interactive learning atmosphere. In each session, the students of the experimental group are required to review the content of the video lessons that they had watched before in-class time with their teacher. In doing so, the teacher-learner's interaction take place while being engaged in a variety of discussions regarding the content and generating more critical questions. Besides the in-class time is devoted to several hands-on activities that engage the teacher as well as the learners in escape free from boredom. Learners of the flipped classroom model also work in small groups or in pairs in which interaction took place among and between students. Working this way, students are able to learn effectively, develop their phonology knowledge and enhance their phonology skills.

The flipped classroom model could enhance the experimental group participants' learning outcomes by engaging them in innovative tools that match their learning styles (Bergmann & Sams, 2012). Jundt (2015) found out in his study that the flipped classroom model fosters an increase in the 21st century skills for learning in the classroom. Students, according to him, manifest different skills such as collaboration, creative thinking and innovative learning. Bergmann & Sams also believe that the use of technology in the flipped model fosters a solid interaction with their students. They believe "that flipping the classroom creates an ideal merger of online and face-to-face instruction that is becoming known as a "blended" classroom" (Bergmann & Sams, 2012, p. 25). In the flipped phonology course, there is an increase in students' engagement through class discussion and practice during in-class time. Moreover, students are able to get cognitively engaged with the course content using innovative technological devices like computers and cellphones. Through classroom discussions, students are also able to share their own thoughts, agree or disagree with certain views and to support certain claims by examples from their mother language. This collaborative process leads to the manifestation of many communicative skills such as negotiation, evaluation and analysis skills.

6. CONCLUSION

The present study has examined the effectiveness of the flipped classroom model in a Moroccan university setting in general and for EFL phonology teaching in particular. The study was designed to determine the effects of the FCM on EFL phonology students' academic achievement. This was investigated through comparing control group and

experimental group participants' mean scores on the achievement pre-test and post-test. The use of the quasi-experimental design in this semester-long study allowed the researcher to assess EFL phonology students' academic achievement at two points of measurement. The first before the experiment using a pre-test and the second at the end of the experiment using a post-test. The results of all the t-tests which were run on EFL phonology students' overall scores on the two tests showed and proved that the implementation of the flipped classroom model had a significant role in enhancing experimental group participants' academic achievement in the flipped phonology course by the end of the experiment. The results of this investigation also showed that the control group participants exhibited a slight improvement in their phonology academic achievement when compared to the significant higher mean scores obtained by experimental group in the FPC at the end of the treatment.

The findings of this study have proven that the flipped classroom model can be an effective teaching method to improve EFL Phonology students' academic achievement. This was attributed to students' ability to come to class with more phonology background knowledge, the extensive accessibility students had to the course content in class and out of class, the new role assigned to the teacher, the collaborative learning environment where classroom interaction is fostered and to the student-centered approach that the model centers on. Taken together, these benefits suggest that that the effectiveness of the FCM in teaching must be taken into serious account by Moroccan university professors. In general, therefore, it seems that EFL teachers, mainly professors of phonology, phonetics, syntax and other branches of linguistics, can implement the FCM in their classrooms for its unlimited number of benefits.

Therefore, the experimental research design that has been adopted may qualify this study to be a significant contribution to the field of research of EFL teaching and learning. The key strengths of this study are its semester-long duration and the large sample size of participants. The quantitative and qualitative data on which this study was based would enable the researcher to draw reliable conclusions and recommendations about the effectiveness of the FCM in university EFL settings and its effects on enhancing EFL phonology Students. The findings of this research would provide a new understanding of the FCM and extend our knowledge of its effectiveness with valid conclusions and implications that could be generalizable to similar educational contexts in Morocco and elsewhere.

REFERENCES

Al-Zahrani, A. M. (2015). From passive to active: The impact of the flipped through social learning platforms on higher education students' creative thinking. Br J Educ Technol *British Journal of Educational Technology, 46*(6), 1133-1148. doi:10.1111/bjet.12353

Baker, J. W. (2000). The "Classroom Flip": Using web course management tools to become the guide by the side. In J. A. Chambers (Ed.), Selected papers from the 11th International Conference on College Teaching and Learning (pp. 9-17). Jacksonville, FL: Florida Community College at Jacksonville.

Bergmann, J. & Sams, A. (2012b). Flip your classroom: Reach every student in every class every day. Washington, DC: ISTE; and Alexandria, VA: ASCD.

Bensoukas, K. (2016). Digital Learning Resource Development and Flipped Learning-Innovative Teaching of "Introductory Phonetics". Languages and Linguistics 38, pp. 73-92. Retrieved from: https://www.academia.edu/37596326/Digital_Learning_Resource_Development_and_Flipped_Learning-Innovative_Teaching_of_Introductory_Phonetics_2016_

Bormann, J. (2014). *Affordances of flipped learning and its effects on student engagement and achievement.* (Master of Arts Dissertation, University of Northern Iowa).

Butterick, A. (2017). *The effectiveness of the flipped classroom for students with learning disabilities in an Algebra I resource setting*. Theses and Dissertations. 2410. Retrieved from: http://rdw.rowan.edu/etd/2410

Ceylaner, S.G., & Karakuş, F. (2018). Effects of the Flipped Classroom Model on Students' Self-Directed Learning Readiness and Attitudes Towards the English Course. Canadian Center of Science and Education. *English Language Teaching; Vol. 11*, No. 9; 2018. Retrieved from: URL: http://doi.org/10.5539/elt.v11n9p129

Diab, K., M., A., (2016) "The effect of using flipped classroom instruction on students' achievement in the new 2016 scholastic assessment test mathematics skills in the United Arab Emirates". Theses. 364. Retrieved from: https://scholarworks.uaeu.ac.ae/all_theses/364

Elian, S.M., Hamaidi, D. A. (2018). The Effect of Using Flipped Classroom Strategy on the Academic Achievement of Fourth Grade Students in Jordan. I*nternational Journal of Emerging Technologies in Learning, 13*(2), 110-125. doi.org/10.3991/ijet.v13i02.7816

Farah, M. (2014). The Impact of Using Flipped Classroom Instruction on the Writing Performance of Twelfth Grade Female Emirati Students in the Applied Technology High School (ATHS). (Unpublished master's thesis). The British University in Dubai

Faretta, R., S. (2016). A causal-comparative inquiry into the significance of implementing a flipped classroom strategy in nursing education. (Doctor of Education Dissertation, Liberty University, Lynchburg VA).

Flipped Learning Network (FLN) (2014). The Four Pillars of F-L-I-PTM. 3/5/2015. Retrieved from: http://flippedlearning.org//site/Default.aspx?PageID=92

Ganai, M. Y., & Mir, M. A. (2013). A comparative study of adjustment and academic achievement of college students. *Journal of Educational Research and Essays, 1*(1), pp. 5-8.

Gay, L. R., Mills, G. E., Airasian, P. (2012). Educational Research: Competencies for Analysis and Applications.

Giannakos, M.N., Krogstie, J. & Chrisochoides, N. (2014). Reviewing the Flipped Classroom Research: Reflections for Computer Science Education. Proceedings of the Computer Science Education Research Conference. Retrieved from: https://dl.acm.org/citation.cfm?doid=2691352.2691354

Holik, M., T. (2016). *Comparing the Effectiveness of Flipped Classroom and Traditional Classroom Student Engagement and Teaching Methodologies*. (Doctor of Education Dissertation, Lindenwood University).

Jundt, P., Moormann, K. A., Voorhees, A. M., & Ziemann, S. (2015). The Impact of a Flipped Classroom on Student Achievement in Mathematics, Science and Physical Education Classrooms. Retrieved from Sophia, the St. Catherine University repository website: https://sophia.stkate.edu/maed/98

Karagöl, İ., & Esen, E. (2019). The effect of flipped learning approach on academic achievement: A meta-analysis study. Hace*ttepe University Journal of Education, 34*(3), 708-727. http://dx.doi:10.16986/HUJE.2018046755

Logan, B. (2015). Deep Exploration of the flipped classroom before implementing. *Journal of Instructional Pedagogies. Volume 16* (pp. 1-12). Retrieved from: https://files.eric.ed.gov/fulltext/EJ1106741.pdf

Love, B., Hodge, A., Grandgenett, N., & Swift, A. W. (2014). Student learning and perceptions in a flipped linear algebra course. *International Journal of Mathematical Education in Science and Technology, 45*(3), 317-324. doi: http://dx.doi.org/10.1080/0020739X.2013.822582

Mimouni, A., & Tamer, Y. (2020). The Effect of Music on Moroccan Students' Acceptance of Kahoot Gamified Quizzing in the EFL Classroom. *International Journal of Language and Literary Studies, 2*(2), 210-220. https://doi.org/10.36892/ijlls.v2i2.303

Moran, C. M. (2014). Changing Paradigms: A Mixed Methods Study of Flipping the English Language Arts Classroom (Doctoral Dissertation) North Carolina State University.

Overmyer, G. R. (2014). The flipped classroom model for college algebra: Effects on student achievement (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses. (Order No. 3635661)

Perry, N.E. (1998). Young children's self-regulated learning and the contexts that support it. Journal of Educational Psychology, 90, 715-729.

Pierce, R., & Fox, J. (2012). Vodcasts and active-learning exercises in a "flipped classroom" model of a renal pharmacotherapy module. American Journal of Pharmaceutical Education, 76(10), article 196

Pintrich, P. R., Smith, D. A. F., Garcia, T., McKeachie, W. J. (1991) A Manual for the Use of The Motivated Strategies for Learning Questionanire (MSLQ). Retrieved August the 5th, 2018 from https://files.eric.ed.gov/fulltext/ED338122.pdf

Quint, C. L. (2015). A study of the efficacy of the flipped classroom model in a university mathematics class (Order No. 3707108). Available from ProQuest Dissertations & Theses Global. (1695832181). Retrieved from http://search.proquest.com/docview/1695832181?accountid=62373

Syam, M. (2014, September 10). Possibility of Applying Flipping Classroom Method in Mathematics Classes in Foundation Program at Qatar University. Retrieved from: http://www.ocerint.org/Socioint14_ebook/papers/68.pdf

Sarkar, S., & Banik, S. (2017). A study on the adjustment and academic achievement of adolescent students. *International Journal of Research Granthaalayah, 5*(6), 659-668. DOI: https://doi.org/10.5281/zenodo.825592

Steinmayr, R., MeiBner, A., Weidinger, A., & Wirthwein, L. (2015). Academic achievement. Retrieved from http://www.oxfordbibliographies.com

Tsui, A. B. M. (2001). Classroom interaction. In R. Carter & D. Nunan (Eds.), The Cambridge Guide to Teaching English to Speakers of Other Languages (pp. 120–125). Cambridge, United Kingdom: Cambridge University Press.

Vang, Y.V. (2017). The impact of the flipped classroom on high school mathematics students' academic performance and self-efficacy. Unpublished doctoral dissertation. California State University.

York, T.T., Gibson, C. & Rankin, S. (2015). Defining and Measuring Academic Success. Practical Assessment, Research & Evaluation, 20(5). Available online: http://pareonline.net/getvn.asp?v=20&n=5

Zappe, S. Leicht, R., Messner, J., Litzinger, T. & Lee, H. (2009). "Flipping" the classroom to explore active learning in a large undergraduate course. American Society for Engineering Education

AUTHORS' BIO

Dr. Mohsine WAHIB is an Assistant Professor of Phonetics and Phonology at the Faculty of Letters and Humanities in Agadir, Ibn Zohr University, Morocco. His research interest includes applied linguistics, theoretical linguistics, educational technology and pedagogical innovations in language teaching and learning.

Dr. Youssef TAMER is a Professor of Applied Linguistics at the Faculty of Letters and Humanities in Agadir, Ibn Zohr University, Morocco. His research is focused on Teaching and Learning of Languages, Sociolinguistics, Language Planning and Policy, and Educational Technology