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A Quantitative Study of the Impact of Flipped Learning Classroom (FC) on EFL Sixth Grades Students' Grammar Achievement in E-Learning Context

Linguistics Society of Iran

*[1]Vahid Norouzi Larsari**

ABSTRACT

The rapid development of technology has significantly transformed education, with virtual learning becoming a prominent teaching method. The flipped classroom (FC) model, which reverses traditional classroom activities by integrating teaching materials like videos or PowerPoint presentations, has gained traction as a cutting-edge approach. This study investigates the impact of FC instruction on sixth-grade students' grammar achievement compared to traditional face-to-face teaching. A quantitative research approach was employed, with 100 students selected from a pool of 120 based on their Quick Oxford Placement Test scores. These students were divided into control and experimental groups. The control group received traditional instruction, while the experimental group engaged in FC instruction using the Shad application. Over a two-month period, both groups participated in a pretest and posttest focused on English grammar. After 16 sessions of instruction, Independent-Samples t-tests revealed that the experimental group performed significantly better than the control group. The results underscore the effectiveness of the FC model in enhancing students' academic performance and self-efficacy in virtual learning environments. The study's findings offer valuable insights for educators, curriculum developers, and policymakers, highlighting the potential of the FC model to optimize instructional approaches. These results suggest that educators and institutions can use the FC model to improve student outcomes in various educational contexts. Further research is recommended to explore the long-term impacts of the FC model and its adaptability across different educational settings.

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1. PhD in Education, Department of Pre-primary and Primary education, Faculty of Education, Charles University, Prague, Czech Republic - *Email: vahid.norouzi@pedf.cuni.cz*
ORCID ID: (https://orcid.org/0000-0002-3359-2677

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1. Introduction

1.1 Background of the study

In the late 20th and early 21st centuries, the advent of technology, particularly information and communication technology (ICT), has profoundly influenced all aspects of individual and societal life. With the collapse of temporal and spatial boundaries, the earth has transformed into a global village (Lee & Lee, 2010). Information and communication technology (ICT) has exerted a considerable influence and is currently reshaping various domains, with education being a notable example. This includes a significant impact on traditional educational practices.

The rapid technological development of the world has highlighted that traditional educational methods are no longer sufficient to meet students' needs. Efforts have been made to promote students as creators and producers of knowledge, and to open new doors in the fields of science and technology, by providing innovative methods tailored to students' personal and social requirements. Additionally, recent decades have seen the emergence of new methods that shift knowledge transfer from a behavioral to a constructivist perspective.

Experts, including Rahimi and Fathi (2021), emphasize the importance of employing cutting-edge, student-centered techniques in constructivism. Currently, the teaching of English is one of the most significant and widely utilized fields in education worldwide, with English instruction being a high priority. However, despite its importance, teaching English often remains a traditional component of school curricula, with methods not fully adapted to the varying needs of diverse learners. To address this, creative educators have developed innovative pedagogical strategies aimed at enhancing self-efficacy, motivation, and the overall quality of language learning (Johnson, Becker, Estrada & Freeman, 2014; Rahimi & Fathi, 2021).

Educational technology experts, as noted by Maghsodi (2021), assert that while many current teacher preparation programs align with traditional goals and are suitable for a pre-computer era, they fall short in addressing the needs of the 21st century. However, the rapid advancement of technology in education led to the emergence of a novel instructional method, commonly referred to as blended learning. As described by Bonk & Graham (2012), this innovative method merges conventional education with online practice to foster a collaborative, learner-centered environment. A key aspect of blended learning is flipped instruction, which, by rearranging the learning mechanism, allows students more study time before, during, and after class, enhancing their learning experience (Bergmann & Sams, 2012; Kushairi & Ahmi, 2021; Fathi, Naghshbandi, & Mohamadi, 2021).

Lage et al. (2000) initially introduced the FC model in education. However, it was Bergman and Sams who significantly expanded on this innovative strategy. In 2012, they published the book "Flip Your Class," thereby coining the term "*Flipped Class*." As American chemistry teachers, the authors detailed in their book various student challenges encountered during lessons, such as tardiness, superficial conceptual understanding, poor learning strategies, low motivation, and a lack of interest

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in certain subjects. To address these issues and cater to individual student needs, they advocated for personalizing the teaching-learning process through presentations and the flipped class model. The term "inverting" or "inverting the class" refers to the practice of reversing the traditional classroom dynamics – what is typically done in the classroom is moved to the home, and what is usually homework is done in the classroom (Fathi & Rahimi, 2020).

1.2 Objective of the Research and Research Questions

This research aimed to examine the effect of the FC model on sixth graders' grammar achievement. The study also sought to analyze whether there is a significant difference between the implementation of the FLC model and traditional classroom methods in improving the grammar achievements of Iranian EFL sixth graders. To achieve this, the research focused on the following question:

RQ (1): *Is there any significant difference in terms of English Grammar achievements of Iranian sixth grades students when comparing those who were taught through flipped learning method (experimental group) and those taught through traditional method (control group)?*

2. Literature Review

2.1 Definitions of Flipped Learning Classroom

Although the terms "*flipped classroom*" and "*flip teaching*" have recently gained prominence in education, the underlying teaching strategy is not a new concept (Berrett, 2012; Davies, Dean, & Ball, 2013). Over the past decade, the literature has introduced several terminologies to describe this model. This approach inverts the conventional structure of in-class lectures and outside homework. Some of these terms include inverted classroom, just-in-time teaching, flipped classroom, and inverted learning (Fulton, 2012; Hung, 2017).

Several terms exist for the FC model, including the *inverted classroom*, blended learning, and simply "flip" (Bergmann & Sams, 2013). In this model, the traditional approach of using class time for direct instruction and assigning content-related homework is reversed, or "flipped." This allows students to access instructional materials at home, freeing up class time for various educational activities. Milman (2012) emphasized this point:

> The concept revolves around the notion of optimizing valuable classroom time. Instead of utilizing this time for traditional concept introduction by the instructor, typically through lectures, the approach suggests that instructors can develop alternative teaching tools such as video lectures, screencasts, or vodcasts. This method effectively imparts the necessary concepts to students outside the conventional class setting. Consequently, this frees up classroom time, allowing it to be dedicated to more interactive and often collaborative activities, which are usually conducted under the

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> guidance of the instructor (p. 85).

The FC approach has risen in prominence, primarily attributed to technological progress and the expanded availability of computers and various mobile devices, as highlighted by Davies and colleagues in 2013. However, the flipped learning classroom model lacks a single, widely accepted description, as each instructor adopts a unique method of instruction. The phrase "homework is done in class and classwork is done at home" is a popular explanation of the flipped approach, but Kostka & Lockwood (2015, p. 2) argue that this phrase does not fully capture its essence. Bergmann and Sams (2014) suggest that moving direct instruction outside of the classroom is "a great place to begin your journey, but it is not the destination itself."

Abeysekera and Dawson (2015) characterized the FC model as:

> a composite of educational strategies, encompassing three core elements: Firstly, it involves the transfer of most of the direct information delivery outside of the classroom setting. Secondly, it prioritizes the utilization of class time for engaging in activities that are both interactive and collaborative. Lastly, it necessitates the completion of designated tasks by students, either prior to or following the class, to maximize the efficacy of the in-class activities (p. 3).

Abeysekera & Dawson (2015) claimed that their definition of the FC model is a superset of all other definitions. This is because it avoids making claims about the model's benefits, criticizing conventional teaching methods, assuming motivations of implementers, or specifying the technologies to be used.

Bergmann and Sams (2012) defined the FC model as follows: "What is traditionally done in class is now done at home, and what is traditionally done as homework is now completed in class" (p.13). The Flipped Learning Network (2014) provided a detailed definition of the flipped learning classroom, which is:

> Flipped learning represents a teaching methodology where traditional direct instruction shifts from a collective learning environment to an individualized one. This adjustment transforms the group learning space into an active and interactive setting. Within this space, the educator plays a pivotal role in facilitating and guiding students as they actively apply concepts and engage in creative exploration of the subject matter (p. 1).

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2.2 Theoretical Underpinnings of Flipped Learning Classroom

Theoretical foundations underpin the development of the FC model, guiding its evolution. Three key theoretical foundations – constructivism, social learning theory, and experiential learning theory – support the flipped learning classroom. These theories offer a framework for understanding student learning, aiding educators in crafting effective learning environments. Given their extensive application in various teaching models and their significant relevance in education, we have chosen to delve deeper into these theories. Their applicability is particularly evident in the planning and implementation of the FC model.

2.2.1 Constructivism

As the dominant educational ideology, constructivism significantly influences the contemporary learning-teaching process. The ideas of Piaget and Vygotsky greatly inform constructivist learning strategies and teaching techniques (Tzuo, 2007). Unlike conventional learning theories which primarily focus on learning from an individual standpoint, constructivist theories posit that learning is an active process of constructing meaning and knowledge through social interactions.

Constructivists assert that learning, and consequently the representation of reality, emerges from the mental creation of abstract ideas (Bruner, 1961). The flipped model of instruction exemplifies constructivism's principle that students should actively participate in their own education. According to constructivism, students actively construct knowledge and meaning through their experiences and interactions with the world. This concept suggests that students learn most effectively when they are actively engaged in the learning process and have opportunities to apply their knowledge in real-world situations, which carries significant implications for educational practice. The foundations of active, peer, and collaborative learning, based on constructivism, have been highlighted in several studies assessing research on flipped classrooms (Eppard & Rochdi, 2017; Zuber, 2016). The core ideas of constructivism are manifested through the strategies of the flipped classroom. In this model, learning is active, and information is provided to assist students in problem-solving. In flipped classrooms, students are required to construct their own knowledge, facilitating learning and collaboration (Bishop & Verleger, 2013). The constructivist philosophy underpins the educational strategy known as the "Flipped Learning Classroom" (FC). FC engages students in active learning through group projects, hands-on activities, and in-class discussions. By offering access to pre-recorded lectures or instructional videos outside of class time, FLC allows students to take greater control of their learning, focusing on applying their knowledge in meaningful ways during class sessions. Research indicates that the use of the FC model can significantly promote student involvement, critical thinking, and problem-solving skills (Bishop & Verleger, 2013; Lage, Platt & Treglia, 2000). For instance, a study by Strayer (2012) revealed that students in a flipped statistics course demonstrated better conceptual knowledge and higher levels of engagement compared to those in a traditional lecture-based course.

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Song, Singleton, Hill, and Koh (2004) conducted a study and found that the Flipped Learning Classroom (FLC) was effective in promoting higher order thinking skills and increasing student achievement in a computer science course. Project-based learning is a practical application of constructivism within the FLC environment. In a project based FLC, students engage in specific tasks or problems that necessitate the creative application of their knowledge and skills. Employing this strategy enables students to develop their own understanding and meanings while honing crucial teamwork and problem-solving abilities. Overall, integrating constructivism with the FLC can foster an environment that is conducive to student learning and growth.

2.2.2 Bandura's Social Learning Theory

Another theoretical foundation for the FC model is provided by Bandura's social learning theory, which explains how learning occurs and is sustained. Bandura (1977) posited that a student's behavior, environmental context, and past experiences all influence subsequent actions. This theory argues that learning is a social process, where students acquire knowledge through interactions with peers and adults. As Abbott (2007) notes,

> social learning theory highlights the interplay between environmental and cognitive factors in human learning and behavior, emphasizing social context-based learning. It acknowledges that people can learn from one another through methods such as imitation, modeling, and observational learning (p. 25).

Bandura (1997) further explained that students acquire new knowledge and behaviors by observing classmates. His theory categorized various types of learners as observational learners or modelers, emphasizing the cognitive, contextual, and behavioral influences on human behavior. In flipped classrooms, social learning theory is consistently evidenced. Students are exposed to media where a presenter models appropriate behavior. Effective learning occurs through attention, retention, reproduction, and motivation, especially when students focus on the teacher's instructions (Alvarez, 2012; Fulton, 2012a; Miller, 2011). The flipped classroom aligns with Bandura's Social Learning Theory, offering effective modeling of concepts through web videos, teacher-produced films, or other media. Engaged students then retain, replicate, and apply the learned concepts in practice problems and real-life situations. Although the flipped learning classroom may not address every challenge in conventional learning environments, it begins to tackle some, particularly in enhancing student engagement, providing prompt feedback, and fostering collaboration. These aspects can help students retain concepts longer and apply them practically (Alvarez, 2012; Bergmann & Sams, 2012b; Berrett, 2012).

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2.2.3 Experiential Learning Theory

In the 1970s, Kolb developed the renowned Experiential Learning Theory (ELT), positing that learning occurs through the assimilation of new experiences with preexisting concepts. ELT aligns with constructivist principles, asserting that "social knowledge is created and recreated in the personal knowledge of the learner" (Kolb & Kolb, 2005, p. 194). According to Kolb's theory, learning transpires through a cycle of experiencing, reflecting, thinking, and acting. This cycle comprises four stages—concrete experience, reflective observation, abstract conceptualization, and active experimentation, collectively known as Kolb's Learning Cycle. ELT suggests that learners can gain skills and knowledge not only from personal experiences but also through reflecting on those experiences. Recently, the Flipped Learning Classroom model, often simply called the flipped classroom, has gained prominence as a teaching method. This model upends the traditional classroom paradigm by reversing the order of learning activities. In the FC model, students first encounter new concepts and materials through online readings, podcasts, and videos before engaging in physical classroom sessions. The model aims to encourage active student participation in education by allowing them the flexibility to learn at their own pace and on their own schedule. The FC model has been identified as an effective way to implement ELT. According to ELT's experiential learning cycle, the Flipped Classroom Model's use of online resources enables students to explore and reflect on content at their convenience. Furthermore, by facilitating active experimentation in the classroom, the flipped classroom model can help students develop critical thinking and problem-solving skills.

3. Method

3.1 Research Design

The main objective of this research is to examine the effect of FC model on sixth grades students' English grammar achievement. In this regard, this research employed a quasi-experimental design comprising two classes that began their English Grammar class in a private English Language institute in Iran. Two intact classes were divided into experimental and control groups in this design. English grammatical achievement is dependent factors in this study, whereas the teaching models (flipped classroom and face-to-face) are independent variables. The English grammar achievement test was administered to the experimental and control groups as pre-tests prior to the experimental process and as posttest after the intervention. The experimental group (i.e., the flipped classroom), videos, and materials were presented before the class time, while the control group (i.e., the non-flipped classroom), videos, and materials were not presented before the class time. This was done in accordance with the flipped classroom model to free up the class time for student cooperation and collaboration. Both the experimental and control groups had a post-test that included the English grammar achievement test.

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3.2 Participants

Participants in this study were selected from the population of the sixth grades students who were learning English as a foreign language (EFL) in three English Language institutions in Rezvanshahr city, Iran during the winter semester of 2022. Sixth grades students were only male, their age level was ranged from twelve to thirteen years old. 100 elementary level of sixth grade students were chosen from 120 six grade students of Iran who were learning English as a foreign language (EFL) in three English Language institutions in Rezvanshahr City, Iran based on their scores on the Oxford Quick Placement Test (OQPT) and all students had participated in the Oxford placement test prior to the onset of the course, and their scores ranged from a total band score of 0 to 20 which is correspondent to the A1 elementary level according to the interpreting scores of Oxford placement test. It is worth noting that all the sample population in this research were sixth grade male students who were in the same socio-economic status, geographical area, and socio-cultural level in the Rezvanshahr city of Guilan province in the winter semester of the 2022-2023 academic year. After homogenizing, some of the population was dropped out from the study. The researcher then randomly divided the participants into two intact groups, an experimental group, and a control group, each consisting of 50 six graders. The type of sampling was convience sampling in this research.

3.3 Materials and Instrumentations

3.3.1 Oxford Placement Test (OPT): In this study, the researcher utilized the Oxford Placement Test to evaluate the general language abilities of students at the outset. This assessment was crucial to confirm the uniformity of the participants' skills. The test's scoring system divides candidates into four categories based on their English proficiency: elementary (scores ranging from 0 to 20), pre-intermediate (21-30), intermediate (31-44), and upper intermediate (45-50). This well-established test is recognized for its validity, and its reliability has been substantiated in several studies, such as those by Geranpayeh (2003) and Jones (2000). In this specific research, the test's reliability was confirmed through the Kuder-Richardson 21 formula, yielding a high score of 0.85. The study focused on volunteers who fell into the elementary level category. Thus, only those who scored within the 0 to 20 range were chosen for inclusion. Out of 120 students assessed, 100 were ultimately selected for the study. These participants were then evenly distributed into two groups: one experienced the flipped classroom model as the experimental group, while the other received traditional classroom instruction, serving as the control group.

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Table 1: *Interpreting Scores for Oxford Placement Test (OQPT)*

Test	Total	Elementary	Pre-Intermediate	Intermediate
Grammar & Vocabulary	50	***0-20**	31-44	31+

3.3.2 Book Grammar Friends 1: The study utilized "*Grammar Friends 1*," a textbook authored by Tim Ward and published by Oxford University Press in 2013. This textbook contains 15 lessons specifically designed for sixth-grade primary students, focusing on grammar instruction. For this study, the instructor covered 7 of these lessons over 16 sessions, conducted twice weekly within the allocated timeframe.

3.3.3 Grammar Test: This test was developed by Reza Kheir Abadi in 2016. This test consists of 25 multiple-choice questions, derived from Macmillan Publisher's standardized tests for beginner and elementary levels (Ker & Jones, 2007), and modified to suit the linguistic capabilities of sixth-grade primary school students. In some cases, specific words and nouns were localized or contextualized with terms familiar to Iranian primary students to enhance the test's relevance and comprehensibility.

3.3.3.1 Pre-test of Grammar: This 25-item grammar test, meticulously designed and piloted by Reza Kheir Abadi in 2016, is tailored for the experimental study. It includes grammatical rules within sentences and expressions. The pre-test was conducted at the onset of the study to evaluate the participants' proficiency in, and acquaintance with, the specific grammatical structures being targeted. The format of the test is multiple-choice, with 25 distinct items.

3.3.3.2 Post-test of Grammar: This test is a parallel form of the 25-item pretest, with changed sequencing and organization of items to mitigate the effects of learning and memorization. It was used to assess participants' short-term memory regarding the instructed syntactical rules at the end of the treatment sessions.

3.3.4 Power points and work sheets: PowerPoints and worksheets related to the lessons were provided, revised, and sent to the treatment group. Students were tasked with creating PowerPoints for sentences or phrases from their book as homework and sharing them with their peers in the group. They were also allowed to add their own voice to the PowerPoints.

3.3.5 Shad Platform Application: The Shad platform application was used as a social platform for distributing study materials, receiving students' projects, providing online feedback, supervising peer scaffolding and academic achievement, and informing students about upcoming class programs.

3.4 Data Collection Procedures

In this research, the participants were chosen from a cohort of sixth-grade students engaged in learning English as a Foreign Language (EFL) at English-speaking schools. From a group of 120 sixth-grade Iranian students at three English-speaking schools in Rezvanshahr, Iran, a total of 100 students were selected. This selection was based on their performance in the Oxford Quick Placement

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Test (OQPT), where their scores ranged from 0 to 20, indicative of an elementary level of proficiency. It's important to note that the entire sample population comprised male sixth-grade students who were in Rezvanshahr City, Guilan Province, during the winter semester of 2022. They shared the same socioeconomic status, geographic region, and educational background at a similar sociocultural level. After homogenization, a portion of the population was excluded from the study. The remaining participants were randomly divided into two intact groups, experimental and control, each consisting of 50 students. Prior to the experimental process, an English Grammar achievement test was administered as a pre-test to both groups. During the experimental phase, the experimental group received videos and electronic materials via the Shad platform application as a social platform, following the flipped classroom model. They were expected to watch these video lectures at home before attending classes under the FC model. The video lectures, created by the researcher and the participating teacher, covered key grammar points from the Grammar Friends 1 elementary school level. In class, students engaged in activities based on their prior learning at home, including discussions, workbook exercises, collaborative problem-solving, and practice of the learned materials. In contrast, the control group (non-flipped classroom) was presented with videos and electronic materials during class time, following a traditional teaching approach where the teacher delivered material in class, and students completed homework and assignments outside of class. The content and scope of the lessons were identical for both groups, differing only in the teaching method. At the end of the experimental process, a post-test of the English Grammar achievement test was administered to both the experimental and control groups to assess the intervention's impact.

4. Results

4.1 Research Question

RQ_1: *Is there any significant difference in terms of English Grammar achievements of Iranian sixth grades students when comparing those who were taught through flipped learning method (experimental group) and those taught through traditional method (control group)*?

The first research question aimed to explore the impact of the flipped learning approach on the grammatical achievement of Iranian sixth-grade students at the elementary level. For a comprehensive overview of the gathered data, descriptive statistical analyses were conducted. This involved calculating the mean and standard deviation for both the pretest and posttest scores in grammar, within the control and experimental groups.

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4.1.1 Descriptive Statistics of Grammar Pre- and Posttest in Two Groups

Table 2: Descriptive Statistics of Grammar Pre- and Posttest in Two Groups

Tests	Groups	Mean	Std. Deviation
Pretest	Control	15.6200	2.96159
	Experimental	16.0400	2.87821
Posttest	Control	15.9800	2.79570
	Experimental	17.2000	2.06032

As Table 2 shows, the mean scores on the grammar pre-test in the control and experimental groups were close, indicating that they scored very similarly on the grammar pre-test. The mean of the posttest in the control group (M=15.98) and in the experimental group (M=17.20) shows that the flipped classroom group achieved a higher average grammar score and a better grade. Furthermore, the experimental group showed a significant increase from pre-test (M=15.98) to post-test (M=17.20), suggesting better grammar achievement. This finding suggests that the implementation of the flipped classroom model had a positive impact on the grammar achievement of the experimental group. The significant increase from pre-test (M = 15.98) to post-test (M = 17.20) in the experimental group further supports the effectiveness of the flipped classroom approach in enhancing grammar achievement. The observed improvement indicates that the flipped learning model positively influenced students' learning outcomes, resulting in better grammar proficiency compared to traditional instruction.

4.1.2 Grammar Pretest and Posttest Results for Control Group (Non-flipped Learning Classroom)

Table 3: *Descriptive Statistics in Control group (Grammar pretest and posttest)*

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Prettes.Con	15.6200	50	2.96159	.41883
	Posttest.con	15.9800	50	2.79570	.39537

Table 4.7 displays the descriptive statistics for the control group's grammar pre-test and post-test. The outcomes for the control group in both assessments suggest an enhancement in learning efficacy. Nonetheless, further analysis is required to ascertain whether this enhancement is substantial enough to justify the rejection of the null hypothesis.

Table 4. 8: *Paired Samples Correlations*

		N	Correlation	Sig.
Pair 1	Prettes.Con & Posttest.con	50	.169	.240

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For the application of the paired-samples t-test, it is essential to establish a notable correlation between the pretest and posttest scores, signifying a linkage between data collected from these two assessments. According to Table 4.8, there is no statistically significant correlation between the pretest and posttest scores ($p < .05$). This result implies that the pretest scores do not strongly predict or influence the posttest scores. Therefore, any changes observed in the posttest are not directly linked to the participants' initial performance on the pretest.

Table 4. 9: *One sample t-test (Grammar pretest and posttest)*

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Prettes.Con - Posttest.con	-.36000	3.71297	.52509	-1.41521	.69521	-.686	49	.496

The results of the one-sample test showed that there is not any significant difference between the means of the control group from the pre-test to the post-test, and it can be assumed that although the learners in this group have improved in their grammar achievement, the observed difference is not significant enough.

Grammar Pretest and Posttest Results for Experimental Group (Flipped Learning Classroom)

To determine whether there are any improvements or not, the researcher performed the same statistical analysis for the experimental group. The results of the corresponding analysis are shown in the following tables.

Table 4.10: *Descriptive Statistics in Experimental group (Grammar pretest and posttest)*

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Prettest.EX	16.0400	50	2.87821	.40704
	Posttest.Ex	17.2000	50	2.06032	.29137

The mean score for the experimental group in the pretest was 16.04, while it increased to 17.20 in the posttest. This rise in mean scores from the grammar pretest to the posttest, from 16.04 to 17.20, indicates an enhancement in the learners' performance. Yet, it remains to be established if this improvement is statistically significant enough to warrant a rejection of the null hypothesis. Consequently, a paired-samples t-test was performed to examine the differences between the pretest and posttest mean scores of the experimental group.

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Table 4. 11: *Paired Samples Correlations*

		N	Correlation	Sig.
Pair 1	Prettest.EX & Posttest.Ex	50	.766	.000

One of the foundational assumptions of the paired samples t-test is the necessity for a substantial correlation between pretest and posttest scores, which signifies a linkage in the data derived from these two assessments. As evidenced in Table 4.11, the correlation between the pretest and posttest scores is statistically significant ($p < .05$).

Table 4. 12: *One sample t-test (Grammar pretest and posttest)*

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Prettest.EX - Posttest.Ex	-1.16000	1.85560	.26242	-1.68736	-.63264	-4.420	49	.000

Table 4.12 indicates that the significance value is below the p-value of 0.05. Consequently, we can infer that the mean difference is significant, and that the learners' performance improved from the pretest to the posttest. In other words, the null hypothesis related to this research question is rejected. This implies that flipped instruction significantly improves the grammar performance of elementary sixth graders.

4.2.3.1.4 Grammar Posttest Results for Experimental and Control Group (flipped Learning Classroom vs non-flipped learning classroom)

The comparison of grammar posttest results between the experimental and control groups provides valuable insights into the effectiveness of the flipped learning approach in enhancing English grammar achievement. These findings contribute to our understanding of innovative instructional practices and their potential impact on language education, particularly for Iranian sixth-grade students.

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Table 4. 13: *Descriptive Statistics Grammar Posttest in Experimental and Control groups*

	group	N	Mean	Std. Deviation	Std. Error Mean
Posttest	Flipped Learning Classroom	50	17.2000	2.06032	.29137
	Non-flipped learning classroom	50	15.9800	2.79570	.39537

The mean score for the experimental group is 17.20, while the mean score for the control group is 15.98. The experimental group exhibits a slightly higher mean score compared to the control group. However, it is necessary to statistically compare the two means to determine the significance of this difference.

Table 4. 14: *Independent Samples Test: posttest of by Groups*

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Posttest	Equal variances assumed	11.468	.001	2.484	98	.015	1.22000	.49114	.24535	2.19465
	Equal variances not assumed			2.484	90.101	.015	1.22000	.49114	.24428	2.19572

An independent-samples t-test was conducted to compare the grammar post-test scores of the two groups. The significance level of Levene's test was .00, indicating that the variances of the two groups were not equal. Based on the results obtained ($t = 2.484$, $df = 90.10$, $p = .015$, $\alpha = .05$), it can be concluded that the use of flipped learning had a statistically significant effect on the students' grammar performance, leading to the rejection of the null hypothesis of the study.

5. Discussion

The first research question of this study examined whether there were differences in the English grammar achievement of Iranian sixth graders who are learning Enlish as Foreing language (EFL) in English language institutions when comparing students taught using flipped learning classroom (experimental group) and those taught using traditional method (control group). In this part of the research question, "Is there any significant difference in terms of English Grammar achievements of Iranian sixth grades students when comparing those who were taught through flipped learning method (experimental group) and those taught through traditional method (control group)? is answered using the results obtained in the tables in the fourth chapter.

After collecting the data, the researcher used independent samples t-test to analyze them to find out the effectiveness of flipped learning classroom on sixth grades students' grammar achievement.

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According to the Table 4.14, the mean score of the experimental group is 17.20, while the mean score in the control group is 15.98. The experimental group (FC Model) exhibits a slightly better mean score compared to the control group (TL approach). Then, an independent-samples t-test was performed to compare the means of the grammar posttests for the two groups. The significance level of the Leven's test is .00, which means that the variances of the two groups are not equal. Considering the results obtained ($t = 2.484$, $df = 90.10$, $p = .015 <, \alpha = .05$), it can be claimed that the use of flipped learning had a statistically significant effect on the students' grammar performance, thus rejecting the null hypothesis of the study.

The findings showed that the students who received Grammar instruction through flipped learning classroom (FLC) had better performance compared to those who were trained through traditional classroom. The results statistically revealed that experimental group significantly did better than the control group ($p < .05$). Therefore, the null hypothesis of the study "there is not any significant difference in terms of English Grammar achievements of the primary stage in Iranian sixth grades students when comparing students taught using flipped learning classroom (experimental group) and those taught using traditional method (control group) was rejected. In fact, the experimental group gained higher scores on their post-test. This may be due to some appealing features the flipped classrooms have. The results of the independent samples t-test showed that there was a significant difference in post-test English grammar achievement between the performances of learners in the experimental and control groups. In other words, flipped learning had a positive effect on the grammar achievements of sixth grades students. Based on the results of the independent samples t-test, the FLC model has a significant impact on the English grammar achievements of students of sixth graders when students taught in the flipped learning classroom (experimental group) use such are compared, which are taught in traditional teaching methods (control group).

The most striking finding that emerged from the data showed that students in the flipped learning classroom made greater progress in English grammar achievement after the test than students in the control group. This confirms that the implementation of the flipped learning classroom (FLC) model can contribute to the development of grammar achievements in sixth grades school students. The positive result of employing the flipped classroom in this study is in line with the finding of Kheirabadi (2015), indicated that the flipped learning classroom (FLC) had similar effects on English grammar achievements among tenth students in Iran. Kheirabadi (2015) conducted empirical research entitled "*The impact of the flipped learning classroom model on learning grammar in tenth grade*". He used a highly experienced English language teacher conducted a study on two groups of tenth-grade female students in the Fourth District of Tehran. The teacher taught the same English textbook unit using both traditional and flipped learning classroom methods. The data was collected at three levels: A) Multiple-choice test results based on the taught content, B) Feedback from students through a researcher-designed questionnaire, and C) Expert opinion of the teacher through semi-structured

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interviews. The findings analyzed using SPSS statistical software, did not show a significant difference in performance between the experimental and control groups based on the test results. However, in the other two levels, satisfaction, increased motivation of students, and optimization of the teaching process in terms of time management and avoidance of repetitive and tiresome routines were observed. Justification and collaboration of influential groups in the teaching process, especially school administrators and parents, are important for the success of this educational strategy. This study's findings align with those of Al-harbi and Alshumaimeri (2016), who identified a positive influence of the flipped learning classroom model on the development of Saudi secondary school students. Lee and Wallace (2018) similarly observed elevated mean scores among students in flipped classrooms. Consistent with these results, Krolu and Çakır (2017) discovered that flipped instruction notably enhanced students' grammatical competence and speaking abilities. Furthermore, the findings corroborate Obari and Lambacher's (2015) research, which demonstrated the beneficial effects of flipped learning on English language proficiency. Engin's (2014) findings, indicating improvements in language skills due to flipped learning, are also in agreement with this study. A plausible explanation for these outcomes is that students might engage more effectively with pre-lesson videos at their convenience, revisiting the content multiple times for clearer comprehension. This approach, as noted by Herreid and Schiller (2013), facilitates a more efficient use of classroom time, focusing on practical language application rather than extensive lecturing.

6. Conclusion and Implications

The main aim of the study was to examine the effect of FLC on sixth graders' grammar achievement in Iranian primary education context. The researcher also tried to analyze whether there is a significant difference between the implementation of the FLC model and the traditional classroom in improving the grammar achievements of Iranian sixth grades students who are learning Enflish as FL in Iranian English language instutions.

The most useful finding of this study was that comparing FLC and traditional (face-to-face) instruction for the development of grammar achievement could produce positive student attitudes and learning outcomes towards the process of changing grades. The aim was to assess whether there were differences in participants' grammar achievements and their developments in academic achievement in the experimental and control groups. The results of this study showed that students in the FC may perform better on the posttest than participants of the control group. The results of this study showed that the FC not only improved learners' grammar achievement, but also developed learners' positive perceptions of the model.

This study provides important insights into the impacts of implementing a FC model in a virtual primary school setting. The results indicate that flipped learning can significantly improve sixth grades students' grammar achievement in virtual contexts. Students expressed a heightened sense of self-assurance in their capability to engage in autonomous learning and effectively self-direct their

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educational journey. Exam scores also improved compared to traditional lecture-based instruction. Additionally, students had an overwhelmingly positive perception of flipped learning, reporting increased engagement, motivation, and satisfaction with the learning experience. The insights gained from this study show how the integration of technology into a cutting-edge teaching approach has addressed the needs of learners. Unfortunately, Iranian elementary school students find it difficult to be motivated and believe in themselves because of the way they are taught and how they learn. The Iranian EFL environment needs careful study to help students perform better and feel better in primary schools. It is believed that involving (engaging) students in the learning process plays a large part in learning success.

The study provided crucial empirical evidence that the FC strategy is a respectable strategy for facilitating education outside of the classroom and improving students' interactivity skills through student-centered active learning strategies. As new pedagogical and practical applications are crucial with the introduction of new technologies, this could be seen as a suitable approach for EFL environments in the primary school contexts. The students in the experimental group had the opportunity to learn English grammar in a novel way that provided a workable answer to the challenges of elementary-level EFL learning in Iran. This study found that using a FC approach in the English classroom led to better grammar learning outcomes compared to traditional teaching methods. The flipped model allows students to learn content outside of class time through videos or other materials. This frees up more class time for practice and application of the grammar principles. Students in the experimental flipped learning group demonstrated better mastery of the textbook material than those in the traditional lecture-based classrooms. The researcher concluded that the flipped approach provides more opportunities for meaningful grammar practice while overcoming the restrictions of limited classroom time. By moving content delivery outside of class, students can learn at their own pace and the teacher can focus on providing individualized guidance during in-person class. They believed that using the FC model in the classroom was not time consuming and they found it useful for learning new material. The perceptions of the interviewee also determined that sixth graders had positive attitudes towards the FLC model and Shad application as social platform. The students also believed that their performance and achievements could be improved through FC model. The results of this study on the implementation of the FLC model in English grammar lessons indicated pedagogical implications for second language teaching. It was suggested that teachers and institutions should be informed about the importance of recognizing and creating content and materials in environmental education. It can be expected that increased awareness will lead them to take practical steps to create content and materials in environmental education classes. Guidelines were offered for providing opportunities to use and practice English grammar both inside and outside the classroom, e.g. Creating a comfortable classroom environment to increase self-efficacy, organizing group activities to encourage collaborative learning, and selecting materials and topics tailored to

[DOI: 10.22034/jcals.1.2.127]

learners' interests. Another finding of the study is that the reverse model encourages both individual and group learning. Students need to connect with both the teacher and themselves as they need to practice their grammar and assignments at home and complete the exercises in class. Almost every student had their unique pace of learning, and this new model allowed them to explore their needs and learning preferences, which was identified during the therapy process. The two-month treatment period made it clear that the FC model was fully geared to the needs of the students. Rather than acting as an authority figure, the instructor acted as a facilitator. In addition, the FC model encouraged active learning as the videos allowed teachers to focus on other tasks and free classroom time for interesting, hands-on activities. As part of this study, it was found that almost every student had actively participated in group projects, offered help to their classmates, and engaged with the researcher. This engaging learning environment can also be shared outside of the classroom through the Shad application program, which enables students to communicate synchronously with researchers. The literature reviewed does not provide sufficient or specific data to support long-term comparisons of flipped and standard classroom practices. Therefore, more research is needed before these technologies can be used in longer-term offerings. In summary, the flipped classroom is a promising, innovative, and viable technology that can be used to enhance students' learning experiences by flipping the traditional classroom design and to help teachers become more aware, what works and what doesn't work in the classroom and why, as well as what alternatives are practical for their specific teaching methods. In summary, flipped instruction is an appropriate lesson design for the classroom.

6.1 Pedagogical Implications

The results of the present study have confirmed that FLC must be recognizable in a positive attitude of students and learning outcomes towards the process. Prior experience and knowledge of how to implement FC in the EFL elementary classroom can help an instructor become a more effective communicator and teacher. The conclusions of the study may have implications for teachers, students, administrators, and curriculum designers. Elementary English educators can enhance the quality of their instruction by incorporating flipped classroom elements into certain teaching activities. This includes designing activities that bolster learning using suitable digital content, tools, and platforms. Additionally, offering an extensive array of multimedia resources for downloading or streaming, alongside teaching advice, research papers, books, guides, comprehensive teaching packs, and webinars, can significantly contribute to this improvement. This study has another implication for the future of grammar teaching. The creative method used has not yet been used in the grammar classes of language institutes in Iran. It encourages teachers to use learner-centric strategies that give all students more opportunities to actively participate in both presenting and practicing the material. It was found that student participation in the classroom increased during the FLC treatment of this study, which is another benefit of this strategy. In addition, the results of this study may have implications for

[DOI: 10.22034/jcals.1.2.127]

curriculum designers. At the syllabus and material design level, syllabus/ curriculum designers should ensure that the syllabus/curriculum contains integrated courses with flipped learning. To achieve this goal, they should also remind teachers to incorporate technology into their lesson plans. Administrators need to understand the importance of leveraging technology and flipping EFL lessons. Therefore, they should provide state-of-the-art technology in the classroom. Administrators need to take teacher education programs seriously if they want to help teachers improve their computer skills. Teacher preparation programs could include these courses. Iranian English language schools can also incorporate FC teaching strategies into their curricula. By using the reverse method as a modern tool for teaching writing, they can enable their students to progress in writing skills. The results of this study are especially helpful for students who have taken boring, uninspired English courses and need to learn the language in a contemporary environment. Textbook authors/compilers should keep in mind that the new generation are "digital natives" with special and nuanced interests; Therefore, their survival depends on their ability to adapt to the technology-driven generation. They should create interactive content through applications to make their books interesting and effective.

Declaration

I declare that this manuscript is original and has not been submitted to any other journal for publication

Transparency Statements

I affirm that the data supporting the findings of this study are available within the article. Any additional data can be obtained from the corresponding author upon reasonable request.

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I report no conflict of interest.

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Ethical Consideration

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