Research Paper

Effect of Flipped Teaching on High School Students' L2 Grammatical Achievement: Exploring Their Foreign Language Anxiety

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Abstract

Although the review of literature provides some advantages for the flipped classroom learning model in education, there is little research assessing the efficiency of the flipped learning model on second or foreign language (L2/FL) learners' grammar achievements. Moreover, foreign language anxiety (FLA) is an affective factor that is undesirable in the process of L2 grammar learning and should be reduced in classes in schools. The aim of this study was to examine whether the implementation of the flipped classroom model had a significant effect on the grammar achievement of high school EFL students in Iran. Also, it explored their FLA in the flipped classroom. To these ends, two researcher-made parallel versions of a grammar test (grammar pretest and posttest) were developed to examine 60 high school students' L2 grammar achievement in two intact classes from a high school in Isfahan. The participants were assigned into two separate groups (experimental and control). Furthermore, a semistructured interview

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was conducted to collect qualitative data from the 30 participants in the experimental (flipped) group. The quantitative data were analyzed by means of ANCOVA tests. Also, the qualitative data from the interviews were scrutinized through thematic analysis. ANCOVA results revealed the significant effect of flipped learning on the students' L2 grammatical achievement. The qualitative data analysis also provided information about the flipped students' FLA level, sources of anxiety, and coping strategies to deal with FLA. The findings have implications for the use of flipped learning in enhancing students' L2 grammar knowledge and reducing their FLA.

1. Introduction

For many years, the higher education systems in many countries, including Iran, have led their courses based upon traditional face-to-face and formal tutorials. In traditional approaches, several hours should be set out for lectures and classroom instruction by teachers (Paudin, 2017). This holds true despite the great advancements of technology in facilitating access to resources and information. Today, education requires procedural adaptation to the technologically growing world. Changes in how and what we teach are perhaps required. Undoubtedly, without the constraints of a classroom, students can learn anywhere and at any time. Students can be either offline or online to look for information, and their teachers are no longer the exclusive source of knowledge and skills. They prefer the kind of education which enriches their learning experience (Butt, 2014).

In this new era, teachers have been striving for a learning/teaching method that better fits their students' needs (Hao, 2016) and enhances student involvement to attain deep and meaningful learning (Butt, 2014). One of the

suggested models/methods is the flipped learning classroom. As Adnan (2017) explains, flipped learning reverses the sequence of instruction by encouraging students to complete preparatory work before attending the class, allowing more class time on doing learning tasks and developing concepts at a deep level. In fact, class activities that are conventionally done inside the classroom can be conducted outside the class. The flipped learning classroom emphasizes the utilization of technology to make students ready for meaningful classroom learning. This way, it can empower teachers to use classroom time appropriately and personalize their instruction, which is both a challenge and a trend in school-level education (Johnson et al., 2015).

In the domain of second/foreign language (L2/FL) education, the role of L2 teachers and students is sometimes reversed in flipped learning, and the class offers a new plan with more time for questioning, discussion, and interaction, focusing on an L2 skill or a component, such as grammar, vocabulary or pronunciation. Among different components of the linguistic system, grammar, as the foundation of language, holds an important role in L2 learning and needs to be taught through effective methods (Soodmand & Bagherieh, 2015). However, in many traditional L2 classes, L2 grammar instruction has been far from satisfactory (Paudin, 2017). As Al-Jarf (2005) points out, grammar instruction in a foreign language requires so much time and interaction for practicing exercises, which might not be fully accomplished through traditional teaching. Therefore, implementing alternative methods in L2 programs, such as flipped learning, may be promising.

In addition to the linguistic elements, attention needs to be paid to the role of psychological factors in L2 education. One of the psychological variables is *anxiety,* which plays an important role in foreign language learning (Pakdaman et al., 2022; Rifky et al., 2018). In general, anxiety, "is the

subjective feeling of tension, apprehension, nervousness, and worry associated with an arousal of the autonomic nervous system" (Horwitz & Cope, 1986, p. 125). As a type of anxiety, foreign language anxiety (FLA) is "a distinct complex of self-perceptions, beliefs, feelings, and behaviors related to classroom language learning arising from the uniqueness of the language learning process" (Horwitz et al., 1986, p. 128). FLA plays a crucial part in the process of learning a foreign language, often leading to poor performance evaluation in the L2 classroom context (Rifky et al., 2018). Hence, it is important to see whether alternative methods to traditional instructions, such as flipped learning, are expedient to lower, if not eliminate totally, this mental barrier among L2 students, particularly students who are learning English as a foreign language (EFL) in high schools.

Given the above issues, the present research was intended to explore Iranian high school students' FLA after implementing the flipped classroom for learning/teaching L2 (English) grammar. More specifically, this study, first, sought to investigate the effect of the flipped learning model on Iranian high school students' English grammar achievement and, then, explore their FLA in such an environment where English is taught as a foreign language.

2. Literature Review
2.1 Flipped Learning

Technology has profoundly impacted language learning/teaching across the world (Banditvilai, 2016). Technology-enhanced language courses have been found to be beneficial in L2 education as they allow students to work independently with flexibility and at their own pace (Steen & Foldnes, 2018). The widespread use of online and blended learning has made L2 educators consider new alternative instructional modes and models. Blended learning, a recent development in educational methodology, is the combination of face-to-face and online modes of learning.

The flipped classroom has been developed from the rotation model of blended learning (Staker & Horn, 2012). The rotation model involves a program, or a specific course or subject (e.g., L2), within which students rotate on a given schedule or between different learning modalities, such as online and offline modes of learning. In fact, the flipped classroom is often featured by technology-enhanced learning inside or outside of the classroom. This model was first suggested by Bergmann and Sams (2012) in which classroom activities were primarily intended to answer questions and doubts, discuss different points of view, and share results together. Later, the flipped classroom became a place for teachers and students to keep active interaction. In such a classroom, students can preview subject matter content using electronic resources and information provided by teachers before coming to class (Schultz et al., 2014).

The literature on the flipped classroom has reflected upon the outcomes of implementing this innovative method in L2 instruction. The findings and views on flipped learning are sometimes inconsistent. For instance, in an informative review article, O'Flaherty et al. (2015) have cited a number of positive features, such as improved problem solving and critical thinking skills, for flipping the classroom. However, they maintain that there is no conclusive evidence, in general, to prove the effectiveness of flipped learning as compared with the traditional instructional methods. They claim that the dearth of robust proof is because of the localized nature of flipped classroom research.

However, there have been a number of good studies (e.g., Ghufron & Nurdianingsih, 2019; Khodabandeh & Naseri, 2021; Shafiee Rad et al., 2021) demonstrating the effectiveness of flipped learning and articulating positive views towards the flipped learning classroom in L2 teaching/learning. For instance, Khodabandeh & Naseri (2021) examined the effect of blended and

flipped teaching strategies on students' vocabulary learning and skimming technique in a sample of 90 EFL learners from a language institute in Iran. The participants were divided into two experimental (blended experimental and flipped experimental) groups and one control group, receiving instruction in three contexts: in a mixture of the electronic and traditional learning context, in the electronic context, and in the traditional learning context, respectively. The data analysis revealed that blended and flipped teaching strategies had a positive effect on improving students' English vocabulary learning and skimming skill. In another study, Ghufron and Nurdianingsih (2019) investigated the effect of flipped instruction in the context of teaching English writing in Indonesia. In-class evaluation, lesson plan research, focus group interviews, and questionnaires were used to gather data for their report. An overall of 5 English writing instructors and 150 college students from 5 non-public universities in East Java had taken part in their study. Their findings revealed that the flipped classroom facilitated better communication among the EFL Indonesian students and improved their writing skills and attitudes.

In the domain of L2 grammar, Nuon and Champakaew (2017) studied the role of the flipped classroom with the aid of information communication technology (ICT) in relation to grammar. They examined whether ICT-assisted flipped classes affected Cambodian university students' grammar achievement. The participants were 41 in the control group who received non-flipped classroom instruction and 40 in the ICT-assisted flipped classroom (the experimental group). The results indicated both groups performed better on English grammar academically, but the ICT-assisted flipped classroom achieved higher grammar outcomes. In a more recent study, Webb and Doman (2019) investigated attitudes about learning English grammar in the flipped classroom within three tertiary-level settings in three

countries. A total of 138 students took part in the study, including three experimental groups and two control groups. According to the findings, the experimental groups considerably outperformed the other groups regarding English grammar.

2.2 Foreign Language Anxiety

The affective domain has been frequently studied in relation to foreign language learning. Research on positive affective emotions, like motivation and self-esteem, and negative ones, such as anxiety and more specifically language anxiety, was popular in L2 research since the 1970s. Among these affective variables, FLA has piqued the interest of language teachers and researchers for several decades (e.g., Zhang, 2019).

Psychologists generally describe anxiety as a state of apprehension, a nebulous fear that is only tangentially linked to a specific object (Scovel, 1991). FLA was not explicitly recognized as a distinct kind of anxiety until the mid-1980s. It was first conceptualized by Horwitz et al. (1986) and defined as situation-specific anxiety, namely, "a distinct complex of self-perceptions, beliefs, feelings, and behaviors related to classroom language learning arising from the uniqueness of the language learning process" (Horwitz et al., 1986, p. 128).

A number of studies about anxiety and its impact on L2 learning (e.g., Chang & Lin, 2019; Öztürk & Gürbüz, 2014; Zheng & Cheng, 2018) have been conducted. Generally, their results have revealed that anxiety can play an important role in L2 learning. For instance, Aguila and Harjanto (2016) carried out a study on 23 university students taking English conversation classes in Surabaya, Indonesia. Classroom observations, a questionnaire, and interviews were used to evaluate the students' speaking performance. The results revealed an inverse relationship between the students' anxiety levels and their speaking performance. Also, Ghaith (2020), who examined the

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effect of foreign language reading anxiety on a group of EFL students'
reading comprehension in a private university in Lebanon, reported a
negative effect on the Lebanese EFL readers' comprehension. Interested in
the interplay between the use of pedagogical technologies and anxiety, Chen
and Hwang (2019) examined the effect of concept mapping-based flipped
learning on Taiwanese EFL students' speaking anxiety and performance. The
participants were 72 first-year students taking an English oral-aural drills
course in two groups (experimental and control groups) at a university in
Taiwan. Before class, the experimental group watched some instructional
videos about concept mapping and wrote their reflections on the Moodle
platform. They made concept maps as their presentation drafts to manage and
organize the content of their presentations in the class, whereas the control
group prepared some notes for their presentation in the classroom. The results
showed a significant and negative correlation between the speaking anxiety
of the Taiwanese students' speaking performance in English. They conclude
that using technology-based strategies and interesting activities in flipped
learning approaches can help students reduce their speaking anxiety.

The study of the literature review shows that, despite the substantial
literature on flipped learning, little research has been carried out on to
investigate the effectiveness of the flipped learning classroom regarding both
L2 grammar achievement and FLA, especially in the EFL context of Iran and
at the high school level. It is important for high school students in Iran to
improve English grammar achievement as learning the target language
grammar is a basic feature of FL learning and plays a fundamental role in
achieving communicative competence in the target language (Nassaji &
Fotos, 2011). Moreover, it is significant to employ new pedagogical trends
and alternative instructional methods in high schools to deal with FLA, and,
consequently, reduce it because anxiety is directly associated with deficits in

foreign language achievement and lower gains on language tests (Chen & Hwang, 2019). This issue becomes more important when new models, such as flipped classroom, make use of technology as learning instruction, which can have a mixed effect on FLA (*Aydin*, 2018) In response to these issues, the present study examined the effect of implementing flipped learning by relying on the Edmodo, a *technology*-based educational *tool*, for improving high school EFL students' grammar achievement and compared its effect with that of face-to-face teacher-fronted classroom method, which is traditionally used for teaching/learning L2 (English) grammar in Iran. Also, it explored EFL students' perception of the flipped classroom with regard to FLA to learn about the degrees and sources of anxiety as well as the strategies to reduce it in the flipped classroom. To these ends, the following questions were formulated:

> 1. Is there any significant difference between high school students attending the traditional non-flipped classroom and those taking part in flipped classroom in terms of L2 grammar achievement?
> 2. How do the Iranian high school EFL students perceive the flipped classroom in terms of FLA (level of FLA, sources of FLA, and coping strategies to deal with FLA)?

3. Method
3.1 Participants

The present study was conducted with a sample of 60 Iranian EFL students from two intact classes in a high school in Isfahan. They were all female high school students aged between 13-15 years old, with a mean age of 14, and Persian as the first language. They were studying English in high school and had not taken any course on learning English grammar in language institutes. Besides, they reported that they had not attended any general English learning courses or were not taking out-of-class language

learning courses during the study. They participated in the study and took instruction after taking a language placement test. Based on the performance on the placement test, the students were all at the low-intermediate level. Half of the students were in the control group (n = 30) and the other half were in the experimental group (n = 30).

3.2 Instruments

To meet the objectives, several instruments were used. They include a placement test, two grammar tests (two versions of a grammar test), and a semistructured interview. To ensure the homogeneous entry of participants, a placement test, the Oxford Quick Placement Test (OQPT, 2001), was administered to measure the participants' English language level. This test consisted of 40 items in multiple-choice format, measuring vocabulary and grammar knowledge. The valid test is a standard one and its reliability has been reported by some studies (e.g., Geranpayeh, 2003; Jones, 2000) to be high. The reliability of this test measured through the Kuder-Richardson 21 formula in the current study was also high (0.85).

Two parallel versions of a researcher-made grammar test, developed to measure students' grammar ability before and after treatment, were also used. They were employed as the pretest and posttest. The grammar pretest and posttest were piloted on 30 EFL high school students who were similar to the students in the main study. The parallel form reliability, as measured by Pearson product-moment correlation coefficient, was high ($r = .95$). The reliability, calculated by the Kuder-Richardson 21 formula, was high for the two versions, namely, the grammar pretest and posttest (0.89 and 0.90, respectively). The content validity was checked by experts' judgments. One associate professor and one assistant professor of applied linguistics checked the test content to see whether it corresponded to grammar structures of their

high school textbook, *English for Schools*, *Prospect 3* (Alavi Moghaddam et al., 2019) taught in high schools in Iran. Also, a content validation form was given to three experts (two lecturers and a Ph.D. student, who was an experienced teacher at a high school), asking them to rate each item of the test based on some criteria such as the appropriateness and clarity of the items in representing the English grammar. The final version of the grammar test in the pretest and posttest stages contained 30 multiple-choice items. These tests mainly focused on the tense of verbs such as simple present (to be), simple present tense (do/does), present continuous, simple past tense (regular), and past tense (irregular), object pronouns, possessive adjectives, wh-questions, adverbs of frequency, and possessives. The total score for the grammar test was 30, and the time allocation was 20 minutes.

To explore the participants' perceptions of the flipped learning classroom regarding FLA, a semistructured interview was conducted in Persian with the students in the experimental group. The interview included several open-ended and yes/no questions, such as "Were you anxious in the class?", "What was the reason for your anxiety in the course?", and "What helped you have less language anxiety?" The questions were reviewed by two experienced instructors to provide feedback regarding their appropriateness, clarity, and relevance. Besides, when necessary, the questions were followed by more probing questions. The interviewees' responses were transcribed, translated, and were then coded to learn about the degrees and sources of anxiety as well as the strategies to reduce it. The translations were done by the present researchers and double-checked by two bilingual translators (two Ph.D. students), who were educated, had familiarity with the notions, and were fluent in English and Persian. To check the

credibility of the data extracted from the semistructured interview, member-checking and peer-debriefing were implemented. For the member-checking, five students of the experimental group were asked to review their transcripts and emerging themes to evaluate the accuracy of the interpretations; the peer-debriefing involved two Ph.D. students who were bilingual translators and experts in qualitative data analysis.

3.3 Procedure

This research employed a quasi-experimental design comprising two classes that began their English class in a public high school in Isfahan. First, the placement test (OQPT, 2001) was administered to assess the students' English proficiency level in two classes. The participants scored between 24 and 30 (out of 40 items) on the OQPT and, based on the guidelines (Oxford Quick Placement Test, 2001), they were at level 2 (i.e., lower intermediate). Second, these two intact classes were randomly assigned into experimental and control groups, each with 30 students. Both groups were studying the *Prospect 3* textbook (Alavi Moghaddam et al., 2019) as part of their syllabus.

Third, the treatments were carried out in both groups with the same instructor to reduce the role of teacher variability. The instructor had a specific plan for each group, intending to facilitate progress in learning English grammar for all students, maintaining consistency, and approaching student behavior in a similar way. During the treatment, both experimental and control groups attended English classes two days a week, receiving 90 minutes of instruction in each session. Therefore, the project consisted of twenty-four 90-min sessions in 12 weeks taking both classroom and non-classroom locations into account. The time was also identical for both groups. Within these sessions, different grammar topics, including present

tense, present continuous, possessives, possessive adjectives, wh-questions, adverbs of frequency, past tense, and object pronouns, were taught to both groups.

To make the students in the experimental group become familiar with Edmodo, a training session was held in the first week. Following that, the instruction started in the second week. For each of the above-mentioned grammar points, at least an instructional video, commonly together with a PowerPoint presentation, was uploaded in Edmodo, namely, the online learning platform. The flipped learning model was implemented in the following stages in the experimental group:

•**Pre-class Stage**

The pre-class phase aimed to assist the students in the experimental group to explore the knowledge of English grammar through educational technology. The students were required to watch tutorial video clips and PowerPoint presentations, and answer related questions or take quizzes about the content of video or PowerPoint files on Edmodo. The videos taught the students grammar structures and language usage. Through Edmodo, the students could share content and ask short questions.

•**In-Class Stage**

Class time was mainly devoted to activities and discussion. This was sometimes done in both English and Persian because of the low proficiency of the participants. The activities were carried out in the classroom after watching an instructional grammar video at home to stimulate the students' active engagement and help them reach a deeper understanding of English grammar. The students in the experimental group had a preview of online video presentations and a wrap-up of the content. They were supposed to present a brief summary of grammar points based on the content of the videos they watched before class. Later, the peer-instruction technique

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through in-class tasks and group discussion was performed for about 30 min in the classroom. They were asked to solve their problems about the target structure (e.g., tense, adverbs of frequency), have asking-answering questions, and present additional key points (e.g., exceptions about given grammar rules). They were sometimes given worksheets to think and write sentences in English based on a given structure. Finally, they were asked to do the simple activities in the *Prospect 3* textbook in groups (pair groups). Their problems were checked by the teacher and peers and some feedback was provided by classmates and teachers in an interactive way.

•**Post-class Stage**

At this stage, unlike the students in the control group, no specific activity or homework was assigned to the students in the experimental group. They were just encouraged to chat (in English) with fiends online, if possible, or write their e-mails in English to consolidate their prior knowledge in English grammar.

The control group was exposed to activities in print format in the in-class and post-class stages. Unlike the experimental group, they did not watch instructional video clips or PowerPoint presentation files on English grammar in the pre-class stage. They were instructed using a traditional mainstream teacher-fronted method. They had initially a 15-minute warm-up by the instructor, which was followed by a 30-minute teacher-led grammar lecture and explanation, during which she talked about the rule of English grammar and gave examples on the whiteboard. From time to time, the teacher used a deductive approach to teach grammar based on the target grammatical point in the *Prospect 3* textbook. Then, the students were provided with a summary of grammar points and were asked to do workbook exercises as homework, in the post-class stage, for the next session. In the following session, the

teacher checked their answers to their exercises done as a homework assignment.

After the treatment in each group, a grammar posttest, similar to the pretest was administered to the two groups. Also, the students in the experimental group were interviewed to explore their perception of the flipped classroom with regard to language anxiety in the high school context. Each participant was interviewed individually for 20 min. This face-to-face interview was audiotaped with the informants' permission. The data obtained from the semistructured interview were transcribed, translated, and analyzed by applying thematic analysis using the Nvivo 11 software.

4. Results

4.1 First Research Question: Effect of Flipped Teaching on Grammatical Achievement

The first research question was formulated to gain information about the effect of the flipped learning method on the grammatical achievement of Iranian high school students at the low-intermediate level. To have a general estimate of the collected data, descriptive statistics, such as the means, standard deviations, kurtosis, and skewness, were calculated for the grammar pretest and posttest scores in the control and experimental groups. Table 1 shows statistics of the grammar pretest and posttest scores in the control and the flipped classroom groups.

Table 1

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

Tests	Groups	Mean	Std. Deviation	Skewness	Kurtosis
Pretest	Control	12.41	3.53	-.03	.14
	Experimental	12.39	3.78	-.04	.15
Posttest	Control	16.13	4.34	.13	-.95
	Experimental	22.73	4.83	.12	-.94

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As Table 1 demonstrates, the grammar pretest mean scores in both control and the experimental groups were calculated to be close, indicating that they performed very much like each other on the grammar pretest. The posttest means score in the control (M = 16.13) and experimental (M = 22.73) groups showed that the flipped group received a higher grammar mean score and had a better outcome. Besides, the experimental group showed a noticeable increase from the pretest (M = 12.39) to posttest (M = 22.73), suggesting a greater grammar achievement.

Subsequently, a one-way covariate (ANCOVA*)* test was performed to address the first research question. To run ANCOVA, it was so important first, to make sure those grammar scores in the pretest as an independent variable had similar variances across experimental and control groups. Thus, Levene's test of equality of variance was implemented. This value for the pretest variable in the present study data was .136 (see Table A1 in Appendix), meaning that the variance was equal and, therefore, the homogeneity of variance assumption was not violated. Second, there was a linear relationship between the dependent (i.e., posttest scores) and covariate (i.e., pretest scores) variables. As Figure A in the Appendix shows, there was no indication of a curvilinear relationship. Third, there was not any interaction between the treatment and grammar pretest scores in covariate analysis, F = .033, p = .856 (see Table A2 in Appendix). This indicates that there was not a very notable difference between the two groups regarding English grammar knowledge before the treatment was conducted. After checking the assumptions, ANCOVA was run on the grammar posttest scores to find an answer to the first research question. (Table 2)

Table 2. *Analysis of Covariance on the Grammar Posttest Scores*

Source	Sum of	*df*	Mean	*F*	*Sig*.	Partial Eta

	Squares		Square			Square
Corrected Model	1066.50	2	533.25	37.68	.000	.569
Intercept	500.31	1	500.31	35.28	.000	.382
Pretest	413.10	1	413.10	29.13	.000	.338
Groups	653.40	1	653.40	46.08	.000	.447
Error	808.23	57	14.18			
Corrected Total	1874.73	59				

According to Table 2, the model was significant, $F = 46.08$, $*p < .01$, supporting the appropriateness of ANCOVA use. Based on the results, the instruction had a significant effect on the participants' grammar posttest scores, $F = 46.08$, $*p < .01$. The effect size was found to be about 0.45, which was large. This effect size shows how much variance in the posttest scores could be accounted for by the independent variable. As Figure 1 displays, the experimental group outperformed the control group. The experimental group exhibited a higher achievement in grammar due to flipped teaching in comparison to the control group.
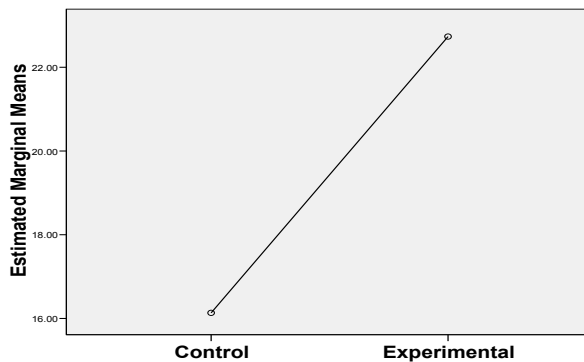

Figure 1. Grammar means score plot of the posttest for two groups

4.2 Second Research Question: Perceptions of FLA

In order to address the second question, a thematic analysis of the transcribed data obtained from the students in the experimental group was conducted. Based on the outcomes, three major codes emerged, including the level of FLA, the sources of FLA, and their coping strategies with regard to FLA (see Figure 2).
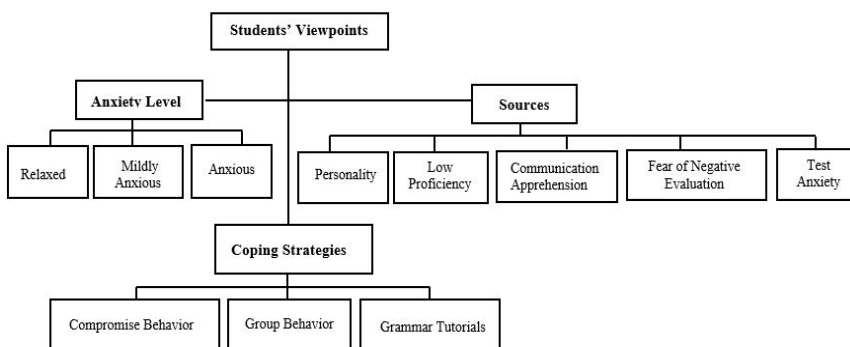

Figure 2. Themes emerged from the semistructured interview

Anxiety Level. The first theme, named *anxiety level*, included the subthemes (i.e., codes) of the *anxious, mildly anxious, and relaxed*. The majority of the students (more than 50%) claimed to be relaxed. However, some students were mildly anxious, and a small proportion was very anxious. Those who were anxious admitted that they felt shortness of breath, clammy sweat, and irregularities in heartbeats when facing grammar tasks. Instead of trying to use the language appropriately, they reported that they became blushed and embarrassed, or avoided doing activities. For instance, one of the students (Melika, 14 years old) reported, "I tremble when I know that I'm going to be called on in the class. I feel more tense and nervous in the English class than in my other classes." However, more than half of the

students were reportedly relaxed or mildly anxious and were satisfied with the flipped mode of instruction. For example, one of the participants (Parisa, 14 years old) shared the following experience, indicating that the flipped learning model worked well on decreasing the students' FLA:

> We [students] were supposed to talk and use new grammar structures in front of our peers and teacher in the class when we meet each other. I was a little anxious at first, and my heart kept pounding, but it was OK later…it felt amazing to use a digital tool to communicate and express our thoughts, knowing that all of the other students were listening attentively.

Sources of Anxiety. The second main theme was identified as *sources of anxiety*. The data provided evidence about the presence of anxiety due to factors such as *personality*, *low proficiency*, *fear of negative evaluation, communication apprehension* as well as *test anxiety,* especially among those students who reported being mildly anxious or very anxious. A fair amount of FLA was related to the students' personality traits such as introversion, lack of confidence, or a sense of frustration in learning grammar. One of them (Hanieh, 15 years old) described lack of confidence in this way:

> Whenever I want to learn some grammar points in English, I become stressed and my body freezes. Two weeks ago, the teacher called me to talk in front of my classmates. At that moment, I wanted to cry … I had a bad feeling …. I do not like to talk before others though I like this course. Watching video files before class is Ok in this method, but I prefer to talk less.

Low proficiency was another subtheme. A few participants reported that because they had low literacy skills in English and did not know much

vocabulary and grammar, they were somehow anxious in the English class. For example, one of the participants (Sahar, 15 years old) explained, "I am a little anxious about learning English grammar in this class due to a lack of English knowledge and writing skill, but … watching files before class is good".

Communication apprehension was another subtheme. Some participants in the flipped group reported that they felt anxious because they might be mocked by their classmates if they attempted to make statements in English regarding the assigned grammar points. One student (Maryam, 15 years old), for example, explained, "I feel embarrassed to communicate with my classmates even outside the class through Edmodo". Communication *apprehension* was shared by a few more students who were afraid of failure to speak English with the teacher. For example, one participant (Shiva, 15 years old) reported, "My English teacher is knowledgeable …, I am anxious to communicate and speak English with her." Another related subtheme was the *fear of negative evaluation*. Actually, some students in the experimental group were afraid of others' negative comments and judgments, especially their classmates' negative evaluations. They reported fear of negative responses as a major source of their anxiety when doing activities in front of other students. One female student (Mahdis, 14 years old) reported, "I like this method of dealing with the grammar, but I felt anxious when I made a grammatical mistake in doing an activity … a friend of mine made fun of me in the class".

Test anxiety was another subtheme. Several students in the experimental group had test anxiety because they reported that they were afraid of taking quizzes on Edmodo. For example, one of the participants (Hasti, 15 years old) commented:

"I do not like tests. I feel anxious. I feel
stressed when I take a quiz on a grammar
point though Edmodo".

Coping Strategies. The last emerged theme included the subcategories of *compromise behaviors, group behaviors,* and *grammar tutorials,* which refer to the students' ways to reduce FLA. The subtheme of c*ompromise behaviors* refers to a kind of defense mechanism that several high school students reportedly used as a constructive response to FLA. In fact, these students reported that they took a step or initiative to reduce their anxiety in their course such as anticipating what they should do in the class, studying harder, or having good preparation for their face-to-face class session, which all helped them reduce their stress in the flipped classroom. A few students reported that they developed positive thinking and encourage themselves about learning English grammar before attending the class, which made them confident and stress-free during practices in the class. For instance, one of the students (Tina, 15 years old) explained:

> I watched the videos before class several times and prepared everything well … I made anticipation and brainstormed some English structures that I wanted to use in the class ... I thought positively and …. Actually, I studied hard before class to increase my confidence and feel relaxed in the class. These made me increase my motivation to learn English grammar.

Group behaviors was another subtheme, which refers to the behaviors of students in groups, from formation to discussion and agreement. It underlines the students' group work during class time. In the flipped group, the students brought questions to class and much of the class time was spent in small or pair groups with a discussion of those questions, intended to clear

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up any confusion or misconceptions that might have come from watching the videos and resources before class. The group behaviors such as debate or discussion, interaction, conformity, teamwork, attention, agreement, and conclusion, helped them to have less FLA. There were many instances in which the students referred to this point. For example, a participant (Setayesh, 15 years old) commented:

> My teacher used to teach in a more traditional way … explaining grammar rules on the board before, but it didn't work well. I was embarrassed in the English class before…. This new method is excellent. We debate, discuss, challenge each other in the class, have teamwork, and make an agreement in the end. I like it and feel more relaxed in the course.

Grammar tutorials was another subtheme. The interviewees were pleased with the opportunity to watch the grammar tutorial videos at a time suitable for them. They reported that it was a positive way to watch the videos several times at convenient times before class. One of the participants (Samira, 14 years old) commented, "when doing some other tasks, I would re-watch segments of the tutorial videos … it fits my personal style of learning and reduces my stress." Several students reported that they watched the tutorial videos several times and took notes, which gave them a sense of autonomy. In this way, they feel comfortable in the class. As Elmira (15 years old) noted: "It is good to learn new things about grammar using the instructional videos at my own pace and at a convenient time… I feel relaxed and free to solve my problems in the class". It seems that using grammar tutorials matched the personal learning styles of some students and reduced their stress in the class.

5. Discussion

The first research question was intended to investigate the effect of flipped learning among a sample of Iranian high school students. The results provided supporting evidence for the overall effectiveness of the flipped learning model in improving the EFL high school students' L2 (English) grammar achievement. Data analysis in the quantitative part revealed that there were noticeable differences in the outcomes comparing the grammar pretest and posttest scores in the two groups. One reason for the high school students' English grammar improvement is the type of higher-level cognitive tasks and activities carried out in the flipped classroom. Classroom activities implemented in the flipped group, such as group discussion and pair groups, allowed the students to spend more time on higher-order processes such as analysis and evaluation. In this way, the students used their critical and creative thinking, which enabled them to deal with problems in the target grammar. Watching instructional videos before class made the students in the flipped group think and analyze information before class, paving the way for evaluating different pieces of information and categorizing them, troubleshooting for solutions, and developing their knowledge about English grammar. This justification can be in harmony with the claim made by Herreid and Schiller (2013), according to which higher-order thinking can be enhanced through flipping the classroom as students take responsibility and watch instructional videos frequently before class and discuss the content in the class. The findings are also in line with, Nederveld and Berge's (2015) contention that teachers can use class time to focus on application and higher-level learning rather than lecturing and other lower-level thinking tasks. Furthermore, in the flipped classroom, the electronic resources through Edmodo were used by the teacher to prepare rich online materials in an interactive way. Even though the students in the experimental group

struggled at first with the new mode of teaching/learning and working with the Edmodo platform, they were quickly adjusted to this mode and found the new method motivating. This issue was supported by the qualitative data. In this way, the students were able to adapt their learning styles and allocate some time to study at their convenient time and solve their problems in the target grammar. It seems that the pre-class activities and quizzes through Edmodo were suitable for the students in the flipped group and increased their engagement and overall positive attitude towards learning English grammar, leading to better outcomes in grammar achievement. The results in the prior research (e.g., Schultz et al., 2014) also indicate that the use of Edmodo can foster innovation, creativity, active participation, and collaboration, and students generally develop positive attitudes toward the use of Edmodo. Research (e.g., O'Flaherty et al., 2015) has also substantiated the supporting role of technology-based resources (e.g., video clips, podcasts, and PowerPoint presentations) alongside flipped learning.

Another reason for greater grammar achievement might be the sense of control and autonomy, as evidenced in the theme of grammar tutorials. The teacher provided the students with an opportunity to develop learner autonomy through self-assessment as it was largely up to the learner to decide how much time they would need to spend watching the tutorial videos and taking questions after watching. In the flipped group, the high school students with a poor command of the English language had more control of their pace of learning and enjoyed personal autonomy, which could increase their cognitive engagement, active participation, and, consequently, English grammar learning. As Steed (2012) argues, the flipped classroom is particularly beneficial for slower students who are able to review online materials as many times as needed, helping them reinforce their understanding of instructional materials. When the high school students faced

any problems about the grammatical points, they received feedback in the classroom to solve their problems either in person or in groups under the supervision of the teacher who was not the complete authority, rather sometimes a good advisor for them (Steen & Foldnes, 2018). These issues are also highlighted in the study by Lucke et al. (2016). They reported a discernible increase in the level of student engagement, interest, and active learning after implementing the flipped classroom in a sample of 44 third-year engineering students. They also pointed out the importance of collaborative learning activities in a flipped classroom which provided prompt feedback while working through concepts in the flipped classroom.

The qualitative data collected to address the second research question regarding the students' viewpoints about FLA revealed several themes such as *sources of anxiety* to uncover significant factors contributing to FLA. Three primary sources of FLA were *test anxiety, communication apprehension*, and *fear of negative evaluation*. Reportedly, some high school students had an experience of anxiety for taking a test or quiz. In the flipped classroom, students commonly self-assess their performance by taking quizzes online. They need to communicate due to the nature of this method, and, consequently, their language performance, by and large, is evaluated by their peers, especially in discussing the topic or video content in pair groups. These factors were highlighted by other scholars such as Hurwitz et al. (1986), Mak (2011), and Öztürk and Gürbüz (2014) as factors contributing to the anxiety in learning any foreign languages. Based on Horwitz et al.'s (1986) theory of FLA, anxiety or fear associated with communication with others, fear about others' evaluation, performance anxiety arising from the failure on tests and examinations form the main components of FLA. Moreover, in support of the results of the current study, the results in Öztürk and Gürbüz's (2014) research on the Turkish EFL students' perceptions of

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FLA revealed that FLA arose from three major factors including fear of making mistakes, a perfectionist attitude, and reactions of other students. The other main sources of FLA were related to the lack of adequate proficiency, including low vocabulary size, deficiency in grammar knowledge, and pronunciations in the foreign language, as well as the type of personality that some of the students had. Those students with negative personality traits, like low self-confidence and high shyness, were less inclined to involve themselves in language activities and discussion. As Haldun (2019) points out, this negative association demotivated the students to practice English during the lesson or outside the classroom and prompted them to show low self-esteem in speaking English.

Based on the second major theme, the high school students used several strategies to cope with their anxiety in the grammar course, indicating the effectiveness of the flipped learning model in L2 grammar courses. One effective strategy was *compromise behavior* used by some students in the flipped group as a constructive response to FLA. This behavioral defense mechanism helped them maintain their confidence and make themselves calm and avoid developing negative attitudes toward the grammar course. Other scholars (e.g., Hung, 2015) also confirm that coping strategies such as compromise behavior prompt students to develop more positive perceptions towards learning as well as a stronger commitment to learning. Moreover, regarding the subtheme of group behavior, it is believed that doing group works promoted cooperation among the high school students and provided them with an opportunity for collaborative learning and problem-solving activities as they shared perspectives and gained insights. It is assumed that discussing and debating with each other helped the students improve communicative skills and experience a sense of success in using English in a real situation. Moreover, learner agency or the belief of the students in

making a difference in their own or others' learning at a certain time in peer discussion in the class and having a sincere atmosphere in which they helped each other attributed to FLA reduction. This argument finds support from the earlier results about the effective role that group behavior strategy plays in students' anxiety reduction (Chang & Lin, 2019). Finally, with regard to the last strategy, it is assumed that grammar tutorials in the form of online video lectures gave the students in the flipped group more control of their grammar learning process and promoted learner autonomy. The teacher provided the students with some authentic materials which were appealing to those who were visually and auditory-oriented. It is likely that they stimulated active engagement and fostered their cognitive engagement, which led to anxiety reduction. The results are commensurate with the findings of some prior studies (e.g., Ghufron & Nurdianingsih, 2019; Zheng & Cheng, 2018) reporting that the students found the flipped classroom environment attractive. They found their flipped classes as a source of motivation, inspiration, and competition because of the peaceful, comfortable, and encouraging learning environment.

6. Conclusion and Implications

This research helped to gain some understanding about high school EFL students' grammatical achievement at a low-intermediate level, along with perceptions and degrees of FLA in the context of Iran. The results showed that the flipped method was effective and improved the EFL students' grammar achievement more than the traditional lecture-based teacher-fronted instructional method. It is very likely that the technology-based resources such as the instructional video files used in this study enriched the content of the course and method of grammar learning and helped the students to improve their personalized learning abilities and sense of autonomy. Also, the flipped learning model probably made the students more cognitively

engaged and active in the classroom. In addition, the results of the interviews revealed the applicability and attractiveness of this model in reducing the high school students' anxiety level. The qualitative results offered some insight into the phenomenon and shed light on the sources of FLA in the course. In the light of the emerging themes, it is concluded that using the flipped learning classroom can reduce FLA. Based on the qualitative data analysis, it is understood that such a method can create a collaborative atmosphere in the classroom, lead to social interaction with peers, encourage EFL students to improve their grammatical knowledge in the target language, facilitate the process of learning the target grammar, and, consequently, reduce anxiety level in the L2 grammar classroom.

The current study contributes to the expanding literature on the flipped classroom and invigorates L2 educators to consider how the flipped learning classroom model can be used alongside or as an alternative to more traditional mainstream methods in teaching or dealing with language components such as grammar. Also, according to the findings, it is highly recommended that materials developers, curriculum developers, and course designers pay more attention to more student-centered approaches, such as the flipped learning classroom, in developing curriculums, programs, and materials for L2 grammar. In the linguistic system, grammar is one of the most tedious aspects of a language which can be very stressful for students (Alnuhayt, 2018; Paudin, 2017). Based on the findings, L2 students can show positive attitudes towards L2 grammar, but traditional teacher-centered classrooms which commonly do not devote enough time for discussion, interaction, reflection, and questioning may, by comparison, fail to improve L2 students' attitude toward learning L2 grammar. This is a promising aspect of flipped learning which can make L2 students feel less FLA.

Overall, the findings indicate the promise of flipping the classroom for high school EFL learners, but it also comes with several limitations. First, the results and recommendations of this study partly depend on perception-driven data. The qualitative interview elicited the students' perceptions about the procedures in the flipped classroom. Second, the generalizability of the findings is restricted due to the small number of participants. It is also worth noting that the learning outcomes reported at this particular research site may not be applicable to other EFL contexts. Put another way, some elements (i.e., learning style, subject matter, teacher characteristics, and task type) may play a part when establishing a flipped classroom, making it so difficult to rule out these confounding factors for research outcomes. Third, although special care was taken for the instruction time to be the same in both groups, it was difficult to have a strict control over the participants' language exposure outside the class in the flipped group. Finally, this study focused on some grammar points for low-intermediate EFL learners and utilized the interview to explore FLA in the flipped classroom. Future researchers can focus on different L2 grammar points with learners at different L2 proficiency levels and utilized other instruments such as Horwitz et al.'s (1986) Foreign Language Classroom Anxiety Scale to investigate students' FLA in the flipped learning classroom.

Acknowledgments

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Appendix: Main Assumptions in ANCOVA

Table A1. *Tests of Equality of Variance for the Grammar Scores*

Test	Variable	F	df1	df2	Sig.
Levene	Grammar Pretest	2.29	*1*	*58*	*.136*

Table A2. *Analysis of Covariance on the Grammar Pretest Scores for the Interaction Effect*

Source	Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Square
Corrected Model	1066.98	3	355.66	24.66	.000	569
Intercept	496.24	1	496.24	34.406	.000	.381
Groups	60.25	1	60.25	4.18	.046	.069
Pretest	413.12	1	413.12	28.64	.000	.338
Groups * Pretest	.477	1	.48	.033	.856	.001
Error	807.76	56	14.42			
Corrected Total	1874.74	59				