Journal of English Language Teaching and Learning

University of Tabriz

2025, 17, 36

The Interactive Role of Field Dependency in the Effect of Flipped Instruction on Iranian EFL Learners' Grammar Achievement

Davoud Amini (Corresponding Author)

Associate Professor of TEFL, Department of English, Azarbaijan Shahid Madani University, Tabriz, Iran.

d.amini@azaruniv.ac.ir

Asma Modarres-Ghazani

MA in TEFL, Azarbaijan Shahid Madani University, Tabriz, Iran.

asmamodarres101@gmail.com

Abolfazl Ghasemzadeh

Professor of Educational Management, Azarbaijan Shahid Madani University, Tabriz, Iran.

ghasemzadee@yahoo.com

ARTICLE INFO:

Received date:
2025.06.26
Accepted date:
2025.10.04

Print ISSN: 2251-7995
Online ISSN: 2676-6876

Keywords:

Flipped Classroom, Field-Independence, EFL, Grammar Instruction, Cognitive Style

Abstract

Prior research demonstrates that flipped approach in English as a Foreign Language (EFL) classroom positively affects learners' achievement. However, the way learners with distinct cognitive styles respond to this method remains less unexplored. This study examines the effect of flipped classroom instruction on grammar learning of Iranian EFL beginners at Iran Language Institute in Tabriz, Iran with different cognitive styles, i.e., field dependent (FD), field independent (FI), and field neutral (FN). A convenience sample of two groups in five classes taught by the same teacher were given a Group Embedded Figures Test to identify their cognitive styles, and a Grammar pre-test and posttest to measure their grammar achievement. Learners in the flipped classes watched videoed lessons of grammar via an application prior to each session. Inside the class, they briefly reviewed the videos and were engaged in interactive activities. Learners in the control group were taught grammar based on their regular syllabus which involved strings of instruction, practice and homework assignment. A two-way ANCOVA revealed that FI learners in flipped classes outperformed their non-flipped counterparts, while FD learners in non-flipped classes performed better compared to FI learners, demonstrating an interaction between cognitive style and the type of instruction. Learners identified as FN performed moderately well in both settings. Overall, flipped classroom led to better grammar achievement. The findings attest to the dynamicity involved in the functioning of flipped instruction. It is suggested that pedagogical variations, individual characteristics, and grammar assessment procedures be taken into account in designing and implementing flipped classrooms.

Citation: Amini, D; Modarres-Ghazani, A. & Ghasemzadeh. A. (2025). The Interactive Role of Field Dependency in the Effect of Flipped Instruction on Iranian EFL Learners' Grammar Achievement. *Journal of English Language Teaching and Learning*, 17 (36), 39-56. DOI:10.22034/elt.2025.67881.2797

Introduction

With their limited access to English-speaking community, English as a Foreign Language (EFL) learners struggle to find opportunities to use English outside the classroom (Lee & Wallace, 2017). Similarly, inside the classroom, learners' individual needs and capabilities are neglected due to whether logistic issues, such as class composure, or instructional demands like syllabus pressure (Mehring & Leis, 2018). In response to this challenge, the Flipped Classroom Approach (FCA) offers a learner-adaptable method of teaching English in which learners can preview the material in accordance with their own pace and learning preferences, usually through technology-assisted procedure wherein classroom instruction involves engaging and collaborative activities, with the teacher merely as the facilitator of learning.

Research has shown that flipped EFL classrooms can lead to improved learning outcomes (Hsieh et al., 2017; Vitta & Al-hoori, 2023) and enhanced student engagement (Afzali and Izadpanah, 2021; Dinçer & Polat, 2022). Flipped instruction can be generally effective in learning L2 grammar with occasionally contradicting results (Al-Harbi & Alshumaimeri, 2016; Al-Naabi, 2020; Khodabandeh & Tahririan, 2020; Webb & Doman, 2016). However, the effectiveness of flipped classrooms may vary depending on such factors as the subject matter, implementation strategies and learners' individual differences.

Previous research suggests that field-dependence/independence (FD/I) as a cognitive style can intervene second language acquisition (SLA) (Chapelle & Green, 1992; Ehrman & Leaver, 2003). Prior research indicates that learners' cognitive styles—specifically, field-dependence (FD) and field-independence (FI)—influence their responses to different teaching methods in teaching grammar. For example, Dabaghi and Goharimehr (2011) reported that FD learners took a greater advantage of an integrative approach to teaching grammar while FI learners showed advantage for discrete-point learning. FD learners are typically social and collaborative, preferring teamwork and communication. In contrast, FI learners tend to be more analytical, internally directed, and autonomous (Ehrman & Leaver, 1995). This cognitive style has been shown to significantly affect how learners process and internalize grammatical structures (Dörnyei & Skehan, 2003).

While flipped instruction has shown promise for enhancing grammar learning, it remains an area of further inquest to find out how cognitive styles such as FD/I may moderate its effects, particularly with EFL learners at the elementary level, whose cognitive and linguistic development may respond differently to instructional innovations. Moreover, the field lacks experimental studies that concurrently investigate instructional mode and cognitive style in the context of grammar acquisition. Therefore, the purpose of this study was to investigate the impact of flipped classroom instruction on grammar learning among FI, FN and FD Iranian EFL beginners. By examining the interaction between instructional approach and cognitive style, this research sought to provide insights into optimizing grammar instruction for diverse learners in EFL contexts. Accordingly, the study aimed to address the following research questions:

1. Does the flipped instruction of grammar to Iranian basic-level EFL learners have any effect on their grammar learning?
2. Do EFL learners with different cognitive styles (field-dependent, field-neutral and field-independent) perform differently in their grammar achievement regardless of the type of instruction (flipped vs. conventional)?
3. Is there any interaction between cognitive style of learners (field-dependent, field-neutral and field-independent) and the type of instruction they receive (flipped vs. conventional) in affecting the L2 learners' grammar achievement?

Literature review

The concept of flipping classroom was introduced in the 1980s to appreciate the value of independent learning and construction of new meanings. Bergmann and Sams (2012) defined the flipped classroom as reverse traditional learning, moving lectures and content delivery (usually through online platforms) to home study and utilizing class time for interactive and engaging activities, with the teacher acting as a facilitator. A scoping review on the effectiveness of FCA in higher education, covering a 20-year period of the related publications between 1994 and 2014 (O'Flaherty & Philips), indicated that despite most of the research showing overall client satisfaction with the FCA, there is little conclusive research evidence consummating the conduciveness of FCA in long-term learning or higher-order skills development. Furthermore, remarkable disciplinary differences have been reported between a variety of subject areas concerning the efficacy of flipped classroom (Cheng et al., 2019).

As the landscape of language teaching evolves, teachers adopt the flipped classroom model as an alternative to traditional teaching methods because in the flipped classroom model, instruction can accommodate technological advances, freeing up classroom time for active participation of learners. The approach has gained considerable popularity since 2014 (Turan & Akdag-Cimen, 2019). FCA reserves affinity with dominating modern language teaching methods such as Communicative Approach and Task-Based Learning, where student interaction, real-world communication, and active engagement of learners is prioritized (Mehring, 2016). Flipped instruction is supported by various language learning theories including Constructivist views, Vygotsky's Sociocultural Theory, Krashen's Input Hypothesis, Bloom's Taxonomy of Education, and Wen's Output-Driven/Input-Enabled model (Mehring & Leis, 2018).

Research suggests that FCA has been effective in promoting various aspects of EFL development (see Vitta & Al-hoori, 2023 for a meta-analytic review). Lee and Wallace (2017) reported that the overall achievement of Korean EFL learners, judged as their final exam scores, was better in flipped classes compared to the conventional classes. It has also been demonstrated that flipped instruction has been conducive to EFL learners' achievements of global writing and writing fluency (Fathi & Rahimi, 2020) as well as reading skills (Juan & Gopal, 2025).

Research specifically focusing on the impact of FCA on grammar learning within EFL has led to mixed results. While some studies report significant grammar improvements with FCA in different EFL contexts (Allahveysi & Aliakbari, 2021; Al-Naabi, 2020; Amini et al., 2022;

Dinçer & Polat, 2022; Khodabandeh & Tahririan, 2020; Maali Tafti & Tabatabaee-Yazdi, 2023; Webb & Doman, 2016), others show minimal or no effect (e.g., Al-Harbi & Alshumaimeri, 2016). In addition to certifying the positive impact of flipped instruction on grammar achievement or performance, some of these studies have reported promotion in learners' psychological states such as improvements in engagement and motivation (Afzali and Izadpanah, 2021; Dinçer & Polat, 2022), overall satisfaction with the grammar class (Mandasari & Wahyudin, 2021), self-efficacy (Mohammadi et al, 2019; Namaziandost & Çakmak, 2020) and willingness to communicate (Zarrinabadi et al., 2021), or melioration in anxiety (Amini et al., 2022; Nabilou & Zarei, 2025).

Grammar learning is a cognitive process and can be influenced by learners' individual differences and a wide range of cognitive and affective variables (Ellis, 2006) which have proven to affect language learner's responsiveness to different teaching methods (Dörnyei, 2005). Gender, age, proficiency, learning styles and strategies, motivation and cognitive styles are some of the individual differences that have been associated with L2 grammar achievements under flipped instruction programs. Marantika (2022) demonstrated the interrelatedness of gender, cognitive style (visual, auditory, and kinesthetic) and the learning outcomes in German as a foreign language. Flipped instruction has also turned out to be more efficacious with high-proficiency learners (Vitta & Al-hoori, 2023). Namaziandost and Çakmak (2020) reported an interaction between learners' gender and self-efficacy within a flipped EFL program where female learners developed a higher level of self-efficacy.

Individual cognitive differences such as cognitive styles are of paramount importance in flipped instruction of L2 grammar (Röthlisberger & Pesta, 2019). Cognitive style refers to the unique way a person consistently perceives, processes, and organizes information (Rittschof, 2010). Psychologist Herman Witkin identified two main cognitive styles (Witkin et al., 1971): Field dependence (FD) and field independence (FI). FD learners typically focus on the "big picture" in the learning process and the way information fits into a larger context. They are greatly influenced by their environment and the opinions of others. They thrive in group settings and value social interaction (Witkin et al., 1977). FI learners, on the other hand, are more analytical, focus on detailed particularities rather than the overall context, and prefer independent work (Witkin et al., 1971).

The multifaceted nature of grammar influences the intricate relationship between learner variables and the teaching method. In this regard, the old-aged theoretical dichotomy between the teacher-dominated deductive approach and learner-oriented inductive approach has been demonstrated to be associated with the effectiveness of flipped instruction in the grammatical achievements of FD and FI learners of English. Research shows that FI learners perform better when grammar is taught deductively while FD learners respond better to the inductive teaching of grammar (Abraham, 1985; Ebrahimi et al., 2013). Furthermore, Pourmoradi and Vahdat (2016) reported more nuanced results regarding the interaction between inductive/deductive methods and learners' gender and cognitive style. While deductive instruction proved effective for all learners, regardless of cognitive style or gender, inductive instruction was effective only for field-independent female learners, but ineffective for field independent male learners.

Several studies have explored how flipped learning impacts students with varying cognitive styles. For instance, Chen et al. (2018) found that field independent EFL learners performed better in a revised (video-based) flipped classroom compared to those with a FD style. Similarly, FI learners outperformed students with FD cognitive styles in a default flipped classroom. Interestingly, while FI learners achieved higher scores, FD ones reported greater satisfaction and engagement with the flipped learning method (Mandasari & Wahyudin, 2021). Similarly, Mubarok et al. (2019) observed that both FD and FI learners were in advantage in terms of writing achievements from flipped instruction compared to conventional instruction while FI learners benefitted more from a flipped classroom. However, the literature on the relevance of FD/FI in grammar achievements from flipped classes is not consistent. For example, Meguro (2020) found that FD/I of EFL learners had no effect on their grammar achievement except when it is combined with analogical reasoning. The contradictory findings regarding the intricacies of the associations between flipped instruction and EFL learners' cognitive preferences along field (in)dependence style in affecting L2 grammar development necessitates further research within varied contextual and instructional settings.

Methodology

Research Design

This study uses a pre-test post-test quasi-experimental design to investigate how flipped classroom instruction affects grammar achievement of the learners with field-dependent, field neutral and field-independent cognitive styles.

Participants

The study involved 78 young female beginning-level EFL learners (aged 10-14) distributed in five elementary-level (Run 2) classes taught by the main researcher at Iran Language Institute in Tabriz, Iran. Since all five classes were taught by the same teacher, the instructional procedures and other experimental conditions were kept in strict control. All participants had been placed by the institute at Run 2 level, a testimony that they shared basic-level English proficiency. The distribution of participants across the study groups and cognitive style has been displayed in Table 1.

Table 1. *Distribution of participants across the study groups and cognitive style*

Grouping	N	FD	FI	Neutral
Experimental	38	19	8	11
Control	40	24	4	12
Total	78	43	12	23

Due to the limitations of prearranged classes, convenience sampling was adopted to select the participants. However, the assignment of the five classes into the experimental and control groups was done randomly. The experimental group (38 learners in two classes) received a systematic instruction based on the premises of FCA. The control group (40 learners in three classes) received regular teacher-centered instruction with homework assignments. The participants' cognitive style was assessed using the GEFT, revealing the distribution of cognitive styles within each group: The experimental group was comprised of 19 field-

dependent, 11 field-neutral, and 8 field-independent learners. The control group consisted of 18 field-dependent, 12 field-neutral, and 10 field-independent learners.

Instruments

Grammar Pre-Test and Post-Test: Since a standardized grammar test specifically tailored to the textbook's grammar points was unavailable, the researcher-teacher designed two parallel grammar tests for pre-post testing. Each test contained 20 multiple-choice sentence completion items directly assessing the grammar topics covered in the textbook (Appendix 1). A pilot test was then conducted with 20 students outside the main research, who had finished Run 2, to assess the tests' internal consistency. The Kuder-Richardson 20 (K-R20) reliability coefficient was 0.68 for the pre-test and 0.64 for the post-test, indicating acceptable internal consistency (Nunnally & Bernstein, 1994).

Group Embedded Figures Test (GEFT): GEFT, a test developed by Witkin et al. (1971), was used to classify learners based on their cognitive style. The GEFT consists of 25 items divided into three timed sections. The commonly accepted cut-off scores for classification are: 0-6 (FD), 7-11 (FN), and 12-18 (FI) (Witkin et al., 1971; Witkin et al., 1977). The GEFT's reliability has been established, with a reported reliability coefficient of 0.82 for men and 0.79 for women (Witkin et al., 1971) and a Cronbach's alpha of 0.89 in an Iranian sample (Emamipour & Shams Esfandabad, 2007). In this study, GEFT with Persian short instructions was used to ensure comprehension by the young adult participants.

Materials and Tools

English Time 1 (Student Book): Six units from *English Time 1* (Rivers & Toyama, 2003) were used as the instructional material based on the institute's schedule. Details of the target grammar topics have been provided in Appendix 1.

Rubika Online Platform: Rubika is a local messaging app, favored for its fast video uploading capabilities. It was chosen for this study because the flipped classroom model requires a blend of virtual and classroom learning. The required multimedia materials were shared with the learners through this app.

Videos: A combination of teacher-made and ready-made videos (below 5 minutes in length) were used in the flipped class. The list of videos has been provided in Appendix II. Teacher-made videos keep students motivated while ready-made videos boast high-quality visuals and require minimal preparation. Research suggests that shorter videos, ideally under 5 minutes, can significantly improve learning in a flipped setting by preventing cognitive overload (Yu & Gao, 2022). Flipped classroom videos are specifically designed learning tools meant to support student learning outside the class, and are not just recordings of lectures. Combining visuals and audio makes learning more engaging and memorable compared to just reading text (Mayer, 2009). Students can also control their learning pace by pausing and re-watching videos as needed (Tucker, 2012).

Procedure

In the first session, the teacher reassured that all learners in the experimental group had smartphones with the Internet and Rubika access. Written permission was acquired from the

participants' parents for sharing their phone numbers to be added to a Rubika group where the teacher would share one teacher-made and two YouTube grammar videos before each grammar session. The control group did not receive these videos. In the second session, the participants in both groups completed a Group Embedded Figures Test to assess their cognitive styles and a grammar pre-test to evaluate their pre-treatment knowledge of target grammatical items. Both experimental and control groups followed the same syllabus. 50 minutes were allocated for grammar instruction inside the classroom for six sessions.

Flipped Classroom Activities: In the flipped classroom, the learners prepared for grammar sessions by watching videos at home, which freed up class time for active learning. To ensure everyone had watched videos, the teacher started each session with a quick 5-minute video review, often using pantomime to act out grammar patterns, with students verbally identifying them. After the review, students participated in several interactive activities for 30 minutes. First, they worked in pairs to unscramble word cards into correct sentences. Next, they filled in gaps in a corrupted text. This type of activity made them actively use their knowledge of grammar and the surrounding text to understand and rebuild the incomplete passage. Then, using pictures, they built relevant sentences in pairs. Additionally, the picture-based sentence building activity, in which students created sentences based on pictures, helped them connect visuals to language, leading to a more practical use of grammar. Lastly, using table-based question-building cards allowed students to practice asking and answering questions, focusing on using grammar in a communicative way. These activities transformed learners from passive recipients of information into active participants, manipulating language and communicating with one another. All activities were first modeled by the teacher with the whole class before being completed in pairs, with the teacher offering assistance. Only after completing these activities were the students asked to complete the textbook activities. These activities mainly included situational drilling. Table 2 compares the main activities in flipped and non-flipped classrooms.

Table 2. *Flipped and Non-Flipped Instruction*

	Flipped Classroom	**Non-Flipped Classroom**
Prior assignment:	Students watch one researcher-made and two YouTube videos and do workbook activities	None
Class Meeting	5 minutes: Video review	15 minutes: Presenting the grammatical point inductively
	30 minutes: Interactive activities including Unscrambling word cards, Corrupted text, picture-based sentence building, Question-building cards	10 minutes: Textbook activities
	10 minutes: Textbook activities	20 minutes: Interactive activities
	5 minutes: Introducing the videos for the next meeting	5 minutes: Chanting a song
Homework assignment	None	Workbook activities

Non-Flipped Classroom Activities: The control group received the conventional instruction prescribed by the institute utilizing a teacher-centered plan. This involved initially presenting the grammar point inductively through oral and written exemplification. This stage took approximately 15 minutes–equal to total lengths of three videos assigned for the experimental

group. Explicit grammar rule instruction was avoided in order to ensure having controlled the intervening effect of deductive teaching. Learners took notes from the board and then practiced through various textbook drills (substitution, transformation, expansion, and communication), guided by the teacher. This included listening to the CD while following along in the book, repeating patterns, reading aloud, and practicing with partners. Next, the same interactive activities used in the experimental classes were done for 20 minutes. The session concluded with a song or chant, where students first listened to the lyrics, then sang along with a karaoke version. Workbook activities were assigned for the next meeting.

Results

The descriptive data concerning the FD and FI participants' grammatical achievement in flipped and non-flipped groups are displayed in Table 3.

Table 3. *Descriptive Statistics*

Group	Cognitive style	Mean	Std. Deviation	N
Non flipped	FI	9.00	3.257	24
	FN	11.33	3.601	12
	FD	13.25	1.708	4
	Total	10.13	3.517	40
Flipped	FI	14.37	3.715	19
	FN	14.27	2.611	11
	FD	13.13	2.850	8
	Total	14.08	3.216	38
Total	FI	11.37	4.359	43
	FN	12.74	3.441	23
	FD	13.17	2.443	12
	Total	12.05	3.898	78

Two-way analysis of covariance was used to explore the three research questions. We checked the normality of the dependent variable, possible outliers, reliability of the covariate, linearity between the dependent variable and the covariate, homogeneity of regression slopes, homogeneity of variances, and multicollinearity as the assumptions of using a two-way ANCOVA.

Kolmogorov Smirnov Test of normality (Table 4) indicates that the Sig. value is larger than 0.05, attesting to the normality of the post-test scores.

Table 4. *Test of Normality of Scores on Grammar Achievement*

		posttest
N		78
Normal Parameters [a, b]	Mean	12.05
	Std. Deviation	3.898
Most Extreme Differences	Absolute	0.134
	Positive	0.091
	Negative	-0.134
Kolmogrov-Smirnov Z		1.186
Asymp Sig. (2-tailed)		120

a. Test distribution is normal
b. Calculated from data

Furthermore, the outliers of the groups (experimental and control) were checked. According to the boxplot below, there were not any outliers in the groups.

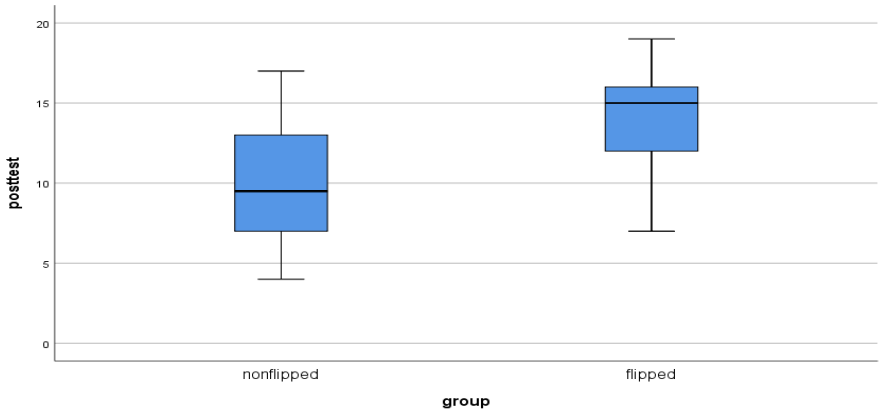

Figure 1. *Boxplot of Outliers*

The internal consistency reliability of the pre-test (covariate) was calculated, resulting in a Kuder Richardson 20 (K-R20) score of 0.68. This score is considered to reflect a satisfactory internal consistency reliability of the covariate. The assumption of linearity requires that the relationship between the dependent variable and the covariate be a straight line for all groups. The scatterplot below shows these linear relationships.

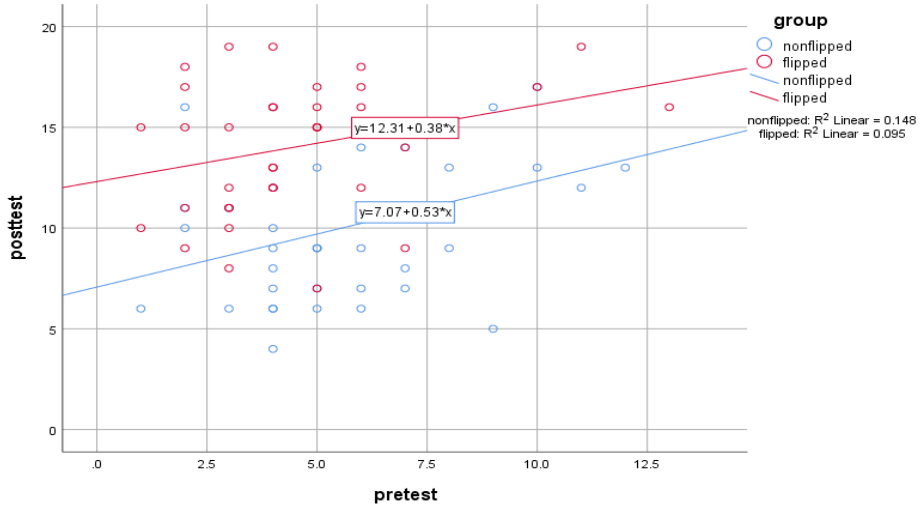

Figure 2. *Linear Relationship between Grammar Pretest and Posttest in the Two Groups*

Levene's Test was used to ensure the homogeneity of variances as illustrated in the Table 5, the Sig value is 0.129>0.05 which means that the variance of the dependent variable is consistent across groups and the assumption has not been violated.

Table 5. *Levene's Test of Equality of Error Variances*

F	df1	df2	Sig.
1.773	5	72	.129

The assumption of homogeneity of regression slopes refers to the requirement that the relationship between the covariate (pre-test) and the dependent variable (post-test) should

remain consistent across all groups. The Sig. value was 0.607 > 0.05, certifying that the homogeneity of regression slopes has not been violated.

Having met the required assumptions, we conducted a 2×3 between groups analysis of covariance to assess the effectiveness of flipped versus non-flipped instruction in our FD/ID/FN learners' grammar achievement. The type of instruction and field-(in)dependence were the independent variables while the scores from the grammar post-test made up our dependent variable. Scores from the pretest of grammar were used as the covariate to control for individual differences. Between-subjects effects are displayed in Table 6.

Table 6. *Tests of Between-Subjects Effects*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	505.390[a]	6	84.232	9.001	.000	.432
Intercept	1300.450	1	1300.450	138.969	.000	.662
Pretest	104.489	1	104.489	11.166	.001	.136
Group	146.751	1	146.751	15.682	.000	.181
Cognitive style	18.215	2	9.108	.973	.383	.027
group * cognitive style	77.553	2	38.776	4.144	.020	.105
Error	664.405	71	9.358			
Total	12498.000	78				
Corrected Total	1169.795	77				

a. R Squared = .432 (Adjusted R Squared = .384)

The Effect of Flipped Instruction on Learners' Grammar Achievement

Research question 1 concerned the possible effect of teaching grammar based on the principles and procedures of FCA on learning grammar. As illustrated in Table 4, the Sig value for group differences in our design is 0.00, indicating a statistically significant difference between the two groups while controlling for the pre-treatment conditions. According to the table of Estimated Marginal Means (Table 7), the total mean score of the learners is 14.133 in the flipped classroom and 10.820 in the traditional non-flipped classroom. Therefore, the findings indicate that the experimental group (flipped classroom) achieved significantly higher grammar scores compared to the control group (non-flipped classroom).

Table 7. *Estimated Marginal Means (Flipped vs. Non-Flipped)*

Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Non-flipped	10.820[a]	.634	9.555	12.085
Flipped	14.133[a]	.532	13.071	15.194

a. Covariates appearing in the model are evaluated at the following values: pretest = 5.24.

The Effect of Cognitive Style on Grammar Achievement

The second research question involved the possible effects of three dimensions of Field Dependent/Independent/Neutral cognitive style in grammar achievement of EFL learners regardless of the type of instruction they received. Estimated marginal means in Table 8 shows that FI learners scored highest on the grammar test, followed very closely by FN and FD learners. However, as can be seen in Table 5 above, the Sig value corresponding to the cognitive

style is 0.383, which does not indicate statistically significant difference between the three cognitive style groups. Hence, the cognitive style of the learners did not have an effect on EFL learners' grammar achievement.

Table 8. *Estimated Marginal Means (Cognitive style)*

Cognitive style	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
FD	11.799[a]	.471	10.860	12.738
FN	12.734[a]	.639	11.460	14.007
FI	12.896[a]	.941	11.020	14.772

a. Covariates appearing in the model are evaluated at the following values: pretest = 5.24.

The Interaction between Type of Instruction Learners' Cognitive Style

Research questions 3 concerned the possible interaction between Flipped/Non-Flipped instruction of grammar on the one hand, and the three dimensions of cognitive style (FD, FN, and FI) on the other in affecting the participants' grammar achievement. The Sig value of the row corresponding to the group*cognitive style in Table 5 is 0.02, indicating a significant interaction between flipped instruction and cognitive style. That is, learners with different cognitive styles responded differently to the two types of grammar instruction.

Table 9. *Estimated Marginal Means (Cognitive Style*Flipped Instruction)*

Grammar Achievement: Posttest

Group	Cognitive style	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Non-flipped	FI	8.728[a]	.630	7.472	9.983
	FN	11.292[a]	.883	9.531	13.053
	FD	12.440[a]	1.549	9.352	15.527
Flipped	FI	14.869[a]	.718	13.438	16.300
	FN	14.175[a]	.923	12.335	16.015
	FD	13.353[a]	1.084	11.192	15.514

a. Covariates appearing in the model are evaluated at the following values: pretest = 5.24.

Table 9 shows that in the flipped classroom setting, learners with a field-independent cognitive style had a higher mean score than those with a field-neutral style, who, in turn, scored higher than those with a field-dependent style. Conversely, in the non-flipped classroom setting, those with a field-dependent cognitive style achieved higher mean scores of grammar achievement compared to field-neutral learners, who scored higher than those with a field-independent style.

Discussion

The present study sought to investigate the distinctive and interactive effects of flipped classroom and learners' cognitive style on EFL beginners' grammar learning. The results indicated that the participants in the flipped classroom outperformed those in the traditional non-flipped class in terms of grammar achievement. This finding is in line with the prior research in different EFL contexts, including China (Web & Doman, 2016), Turkey (Dinçer & Polat, 2022), Oman (Al-Naabi, 2020), and Iran (Allahveysi & Aliakbari, 2021; Amini et al.,

2022; Khodabandeh & Tahririan, 2020; Maali Tafti & Tabatabaee-Yazdi, 2023). The result is, nevertheless, incongruent with Al-Harbi and Alshumaimeri (2016) in Saudi Arabian EFL context. One source of incongruity in results can be the learners' individual differences in terms of a combination of age and proficiency level. Most of the studies mentioned above that verify the effectiveness of FCA had intermediate-plus university students as their participants. In Al-Harbi and Alshumaimeri (2016), the testees who were elementary level high school students recorded a better response to the flipped classroom though the difference did not reach statistical significance. The basic-level young adult learners in our study responded better to FCA. Overall, any generalization about the output of flipping EFL grammar classes must take into account the learners' age and level of proficiency.

In this study, we were unable to stablish a meaningful association between FD/FI cognitive style and grammar achievement regardless of the teaching method though FI participants performed insignificantly higher than their FN and FD counterparts. The finding contrasts the theoretical arguments in favor of FI learners' superiority, in general (e.g., Chapelle & Green, 1992). The record of research on linear relationships between FD/FI and L2 grammar learning is quite limited. Shan (2024) argues that field-independent learners might be in a better position to process language structures as a result of their predominance in analyzing complex input. Nevertheless, excessive self-reliance in learning can restrict output opportunities in the absence of collaborative learning skills. This implies that the presence or absence of the relationship between FD/FI cognitive style and L2 grammar learning will hinge, to a large extent, on the research instrument for testing grammar knowledge or achievement. In this study, we used multiple-choice sentence completion items to assess the learners' grammar achievement. The results might have been different if the grammar test assessed the learners' performance rather than their knowledge. This hypothesis is associated with Wen's output-driven/input-enabled model (Wen, 2013).

The most important finding in this research concerned the interaction between flipped instruction and learners' cognitive style in affecting grammar achievement. FI learners performed better than FN and FD learners in flipped condition. Conversely, FD learners had the highest performance followed by FN and FI learners in non-flipped condition. The supremacy of FI learners in the flipped classroom aligns with findings from Chen et al. (2018) and Mubarok et al. (2019) reiterating that FI learners thrive in engaging and collaborative environments. The cooperative nature of the flipped classroom caters effectively to the needs of field-independent learners (Tinajero & Paramo, 1998). Somaa (2024) argues that flipped classroom is more congenial to cognitive characteristics of FI learners. For one thing, learning from flipped education demands a high level of creativity and active learning on the part of the learners. They must also be able to exploit a variety of sources for learning. On the other hand, FD learners, who often rely on prescribed frames of learning, might find the pre-class work challenging due to the high degree of self-direction required (Somaa, 2024). Therefore, in flipped teaching of grammar, FI learners tend to excel due to their strong analytical skills and independent learning abilities (Witkin et al., 1977). The findings of this study reveal that flipped classrooms are better aligned with the strengths of FI learners. However, the results must be generalized only when confirmed by sufficient empirical research. In their meta-analysis, Vitta and Al-Hoorie (2023) caution that articles indexed in Social Sciences Citation Index have

reported a lower level of connectivity between FD/I and flipped teaching than articles not indexed by SSCI.

Finally, students identified as field-neutral (FN) performed moderately well in both flipped and non-flipped settings. This finding can be explained by the fact that FN learners utilize a more balanced approach to learning, demonstrating both analytical and holistic strategies (Chen et al., 2018). While being FN is not an established cognitive style in the literature, its characteristics can be inferred by observing it on the FI/FD spectrum.

Conclusion

This study assessed the grammar achievement of 78 EFL beginners with different FD/I cognitive styles in both flipped and non-flipped classroom settings. The results showed that learners in flipped classrooms significantly outperformed those in conventional classrooms. Specifically, field-independent learners thrived in the flipped environment but struggled in the conventional, non-flipped one. Conversely, field-dependent learners achieved better results in conventional classrooms and performed poorly in the flipped conditions. Field-neutral learners demonstrated moderate performance in both types of learning environments. Furthermore, the bivariate analyses showed that the type of instruction (flipped vs. non-flipped) had a more significant impact on grammar achievement than the learners' cognitive styles.

Our findings verify the efficacy of FCA in utilizing blended learning to accommodate technology-enhanced learning into EFL classroom. Flipped instruction nurtures a congenial ground for asynchronous teaching activities to facilitate complex cognitive processes such as L2 grammar learning. However, the interaction between flipping grammar instruction and learners' cognitive style attests to the dynamicity involved in the functioning of FCA. As suggested by Vitta and Al-Hoorie (2023), the pedagogical procedures, learner characteristics and L2 outcomes are the three set of factors that can potentially moderate the effectiveness of flipped classroom. Our study was delimited to the interplay between flipping L2 grammar classes and learners' FD/I. Future research can provide a clearer theoretical understanding by focusing on the interplay between flipped instruction of L2 grammar, on the one hand, and various combinations of the following three factors on the other: 1) Pedagogical variations, such as the instructional innovations in adapting FCA to teaching grammar, explicit versus implicit learning, and inductive vis-à-vis deductive procedures for teaching grammar, 2) EFL learners' individual characteristics, such as learning styles, learning strategies, age of acquisition, and level of proficiency, 3) Outcome of grammar instruction indicated in the assessment procedures to measure grammar knowledge or achievement. In addition, the pivotal role played by the teacher in flipped classes in selecting, designing and implementing flipped activities necessitates that the exclusive features of EFL teachers successful in flipped programs be investigated within the framework of "good teacher" studies.

Understanding the complex interactions between FCA and the moderating variables can inform both the designers and practitioners of flipped education of EFL in adjusting this method to the diverse population of EFL learners. The quality of flipped activates is more important than simply inverting the instruction. As underscored by Somaa (2024), a flipped classroom is not a universal solution; rather, it requires meticulous planning and execution.

Acknowledgments

We would like to thank Iran Language Institute for providing the conditions to conduct this research.

References

Abraham, R. (1985). Field independence-dependence and the teaching of grammar. *TESOL Quarterly*, *19*(4), 689-702. https://doi.org/10.2307/3586671

Afzali, Z., & Izadpanah, S. (2021). The effect of the flipped classroom model on Iranian English foreign language learners: Engagement and motivation in English language grammar. *Cogent Education, 8*(1), Article: 1870801. https://doi.org/10.1080/2331186X.2020.1870801

Al-Harbi, S. S., & Alshumaimeri, Y. A. (2016). The flipped classroom impact in grammar class on EFL Saudi secondary school students' performances and attitudes. *English Language Teaching*, *9*(10), 60-80. https://doi.org/10.5539/elt.v9n10p60

Allahveysi, S. P., & Aliakbari, M. (2021). On the effectiveness of using flipped classroom in teaching grammar to Iranian advanced students of ELT. *Research in English Language Pedagogy, 9*(3), 88-101. https://doi.org/10.30486/relp.2021.1930919.1282

Al-Naabi, I. S. (2020). Is it worth flipping? The impact of flipped classroom on EFL students' grammar. *English Language Teaching*, *13*(6), 64-75. https://doi.org/10.5539/elt.v13n6p64

Amini, M., Roohani, A., & Jafarpour, A. (2022). Effect of flipped teaching on high school students' L2 grammatical achievement: Exploring their foreign language anxiety. *Teaching English Language, 16*(2), 169-201. https://doi.org/10.22132/TEL.2022.158977

Bergmann, J., & Sams, A. (2012). *Flip your classroom: Reach every student in every class every day*. International Society for Technology in Education.

Chapelle, C., & Green, P. (1992). Field independence/dependence in second-language acquisition research. *Language Learning, 42*(1), 47-83. https://doi.org/10.1111/j.1467-1770.1992.tb00700.x

Chen, Y.-T., Liou, S., & Chen, L.-F. (2018). The relationships among gender, cognitive styles, learning strategies, and learning performance in the flipped classroom. *International Journal of Human-Computer Interaction, 35*(4-5), 395–403. https://doi.org/10.1080/10447318.2018.1543082

Cheng, L., Ritzhaupt, A. D., & Antonenko, P. (2019). Effects of the flipped classroom instructional strategy on students' learning outcomes: A meta-analysis. *Educational Technology Research and Development, 67*, 793-824. https://doi.org/10.1007/s11423-018-9633-7

Dabaghi, A., & Goharimehr, N. (2011). The relationship between learning styles of field-dependence/independence and integrative/discrete point methods of grammar teaching. *World Journal of English Language, 1*(2), 79-89. http://dx.doi.org/10.5430/wjel.v1n2p79

Dinçer, N., & Polat, M. (2022). The use of flipped learning in EFL grammar instruction. *Asian Journal of Distance Education*, *17*(1), 88-108. https://doi.org/10.5281/zenodo.6460785

Dörnyei, Z. (2005). *The psychology of the language learner: Individual differences in second language acquisition*. Lawrence Erlbaum Associates Publishers.

Dörnyei, Z., & Skehan, Z. (2003). Individual differences in second language learning. In C. J. Doughty, & M. H. Long (Eds.), *The handbook of second language acquisition* (pp. 589-630). Oxford, UK: Blackwell Publishing Ltd.

Easy English with Evi (No author). (2020, October 9). *Lesson 1: Jobs/Present Tense of the verb "to be"/Statements / Pronouns* [Video]. YouTube. https://youtube.com/watch?v=IXswLgafGYA&si=Fo82dfeQDfYzhpYw

Ebrahimi, A., Zeynali, S., & Dodman, K. (2013). The effect of field dependence\independence cognitive style on deductive/inductive grammar teaching. *International Journal of Academic Research in Progressive Education and Development*, *2*(4), 40-48. http://dx.doi.org/10.6007/IJARPED/v2i4/352

Ehrman, M., & Leaver, B. L. (2003). Cognitive styles in the service of language learning. *System, 31*(3), 393-415. https://doi.org/10.1016/S0346-251X(03)00050-2

Ellis, R. (2006), Current issues in the teaching of grammar: An SLA perspective. *TESOL Quarterly, 40*(1), 83-107. https://doi.org/10.2307/40264512

Emamipour, S., & Shams Esfandabad, H. (2007). *Cognitive and learning styles: Theories and assessment* [In Persian]. Samt Publications.

English with Miss Catherine. (2020). *Present Simple Verb 'Like'* [Video]. Available at https://youtube.com/watch?v=cPFnsHAWkq4&feature=shared

Fathi, J., & Rahimi, M. (2020). Examining the impact of flipped classroom on writing complexity, accuracy, and fluency: A case of EFL students. *Computer Assisted Language Learning, 35*(7), 1668–1706. https://doi.org/10.1080/09588221.2020.1825097

Hsieh, J. S., Wu, W. C. V., & Marek, M. W. (2017). Using the flipped classroom to enhance EFL learning. *Computer Assisted Language Learning*, *30*(1–2), 1-21. https://doi.org/10.1080/09588221.2015.1111910

Juan, Y., & Gopal, R. (2025). Systematic review of flipped classroom in EFL reading teaching and learning. *Journal of Creative Practices in Language Learning and Teaching, 13*(1), 17-33. https://doi.org/10.24191/cplt.v13i1.3803

Khodabandeh, F. and Tharirian, M. H. (2020). Exploring the impact of blended, flipped, and traditional teaching strategies for teaching grammar on Iranian EFL learners through English newspaper articles. *Teaching English as a Second Language Quarterly (Formerly Journal of Teaching Language Skills), 39*(3.1), 89-129.

Lee, G., & Wallace, A. (2017). Flipped learning in the English as a foreign language classroom: Outcomes and perceptions. *TESOL Quarterly*, *52*(1), 62-84. https://doi.org/10.1002/tesq.372

M.E.B English (No author). (2023, April 16). *Can / Can't | talking about our abilities | English grammar* [Video]. YouTube. https://youtube.com/watch?v=wscdtGwIp6c&si=y5iScUYqDLSiXrPD

Maali Tafti, M., & Tabatabaee-Yazdi, M. (2023). The effect of online flipped classrooms on high school students' English grammar achievement. *Journal of Research in Techno-based Language Education 3*(1), 1-11. https://doi.org/10.22034/jrtle.2022.353356.1031

Mandasari, B., & Wahyudin, A. Y. (2021). Flipped classroom learning model: Implementation and its impact on EFL learners' satisfaction on grammar class. *Ethical Lingua: Journal of Language Teaching and Literature*, *8*(1), 150-158.

Marantika, J. E. R. (2022). The relationship between learning styles, gender and learning outcomes. *Cypriot Journal of Educational Science*. *17*(1), 56–67. https://doi.org/10.18844/cjes.v17i1.6681

Marlene, L. (2020, March 17). *Can: Can't explanation* [Video]. YouTube. https://youtube.com/watch?v=RGtr-IXUR4c&feature=shared

Mayer, R. E. (2009). *Multimedia learning* (2nd ed.). Cambridge University Press.

Meguro, Y. (2020). The effects of individual differences in field dependence/independence and analogical reasoning for L2 instruction. *System, 94*(4), Article 102296. https://doi.org/10.1016/j.system.2020.102296

Mehring, J. (2016). Present research on the flipped classroom and potential tools for the EFL classroom. *Computers in the Schools, 33*(1), 1–10. https://doi.org/10.1080/07380569.2016.1139912

Mehring, J., & Leis, A. (Eds.). (2018). *Innovations in flipping the language classroom: Theories and practices*. Springer. https://doi.org/10.1007/978-981-10-6968-0

Modarres, A. (2024a). *Can as a model verb for expressing ability (affirmative and negative statement)* [Video]. Aparat. https://www.aparat.com/v/ivzgn1s

Modarres, A. (2024b). *Can as a model verb for expressing ability (question form with answer)* [Video]. Aparat. https://www.aparat.com/v/aabm8j0

Modarres, A. (2024c). *Simple present tense with the verb "like" (affirmative and negative statement)* [Video]. Aparat. https://www.aparat.com/v/pni5496

Modarres, A. (2024d). *Simple present tense with the verb "like" (question form with answer)* [Video]. Aparat. https://www.aparat.com/v/jpjolxz

Modarres, A. (2024e). *To be verbs plus adjectives (statement, question, and answer)* [Video]. Aparat. https://www.aparat.com/v/lawtv9i

Modarres, A. (2024f). *To be verbs plus nouns (jobs) (statement, question, and answer)* [Video]. Aparat. https://www.aparat.com/v/gpd599j

Mohammadi, J., Barati, H., & Youhanaee, M. (2019). The effectiveness of using flipped classroom model on Iranian EFL learners' English achievements and their willingness to communicate. *English Language Teaching, 12*(5), 101-115. https://doi.org/10.5539/elt.v12n5p101

Mubarok, A. F., Cahyono, B. Y., & Astuti, U. P. (2019). Effect of flipped classroom model on Indonesian EFL students' writing achievement across cognitive styles. *Dinamika Ilmu: Jurnal Pendidikan*, *19*(1), 115-131. https://doi.org/10.21093/di.v19i1.1479

Nabilou, M., & Zarei, A. A. (2025). Flipped instruction and its potential to control foreign language classroom anxiety through Shad application. *Journal of Applied Linguistics and Applied Literature: Dynamics and Advances, 13*(1), 1-19. https://doi.org/10.22049/jalda.2024.29687.1681

Namaziandost, E., & Çakmak, F. (2020). An account of EFL learners' self-efficacy and gender in the flipped classroom model. *Education and Information Technologies*, *25*(5), 4041-4055. https://doi.org/10.1007/s10639-020-10167-7

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric Theory* (3rd ed.). New York City, NY: McGraw-Hill.

O'Flaherty, J. A., & Philips, C. A. (2015). The use of flipped classrooms in higher education: A scoping review. *The Internet and Higher Education*, 25, 85-95. http://dx.doi.org/10.1016/j.iheduc.2015.02.002

Pourmoradi, V., & Vahdat, S. (2016). The interactive relationship between inductive-deductive grammar teaching, gender and the cognitive style of Iranian EFL learners. *Theory and Practice in Language Studies*, *6*(11), 2151-2163. http://dx.doi.org/10.17507/tpls.0611.12

Rittschof, K. A. (2010). Field dependence–independence as visuospatial and executive functioning in working memory: Implications for instructional systems design and research. *Educational Technology Research and Development, 58*(1), 99–114. https://doi.org/10.1007/s11423-008-9093-6

Rivers, S., & Toyama, S. (2003). *English Time 1.* Oxford University Press.

Röthlisberger, J., & Pesta, M. (2019). Cognitive style and second language learning. In P. Robinson & N. C. Ellis (Eds.), *Handbook of cognitive linguistics and second language acquisition* (pp. 365-384), *John Benjamins Publishing Company*.

Seed Learning (No author). (2021, May 21). *HG 2 Unit 3 Lesson 2 Be Plus Adjectives* [Video]. YouTube. https://youtube.com/watch?v=qS_cY0Jl3bQ&feature=shared

Somaa, F (2024) The flipped classroom approach: A review of cognitive styles and academic performances. *Cureus 16*(7), Article e63729. https://doi.org/10.7759/cureus.63729

Swain, C. (2020, May 4). *Present Simple Verb 'Like'* [Video]. YouTube. https://youtube.com/watch?v=cPFnsHAWkq4&feature=shared

Tinajero, C., & Paramo, M. F. (1998). Field dependence-independence and academic achievement: A meta-analysis. *The Spanish Journal of Psychology*, *1*(2), 85-96. https://doi.org/10.1111/J.20448279.1997.TB01237.X

Tucker, B. (2012). The flipped classroom: Online instruction at home frees class time for learning. *Education Next, 12*(1), 82-83. http://educationnext.org/the-flipped-classroom/

Turan, Z., & Akdag-Cimen, B. (2019). Flipped classroom in English language teaching: A systematic review. *Computer Assisted Language Learning, 33*(5–6), 590–606. https://doi.org/10.1080/09588221.2019.1584117

Vitta, J. P., & Al-Hoorie, A. H. (2020). The flipped classroom in second language learning: A meta-analysis. *Language Teaching Research*, *27*(5), 1-25. https://doi.org/10.1177/1362168820981403

Webb, M., & Doman, E. (2016). Does the flipped classroom lead to increased gains on learning outcomes in ESL/EFL contexts? *The CATESOL Journal*, *28*(1), 39-67. https://doi.org/10.5070/B5.36040

Wen, Q. F. (2013). Application of output driven hypothesis in college English teaching: Reflections and suggestions. *Foreign Language World, 6*, 14-22.

Witkin, H. A., Moore, C. A., Goodenough, D. R., & Cox, P. W. (1977). Field-dependent and field-independent cognitive styles and their educational implications. *Review of Educational Research, 47*(1), 1-64.

Witkin, H. A., Oltman, P. K., Raskin, E. & Karp, S. A. (1971). *A manual for the embedded figures test*. Consulting Psychologists Press.

Woodward, R. (2016a, October 27). *Can Can't Cannot | Learn English Grammar | Basic English Lesson by Woodward* [Video]. YouTube. https://youtube.com/watch?v=SeLYwHeOodM&si=qK9Xo7I3M38aPdmc

Woodward, R. (2016b, November 8). *Questions with CAN - English Speaking Practice* [Video]. YouTube. https://youtube.com/watch?v=ROzhm8v-a_8&si=JDk2KlInsm4aPxfS

Woodward, R. (2017, August 2). *TO BE + Profession in English | Learn English TO BE | Basic English Less...* [Video]. YouTube. https://youtube.com/watch?v=2lKlpIQunGo&si=F9f_2UjYlfrwgsQ-

Woodward, R. (2019a, July 5). *Like, Likes, don't like, doesn't like - Present Simple Tense in English* [Video]. YouTube. https://youtube.com/watch?v=tidOxlj1T38&si=_23o5dN1tNFWVKE2

Woodward, R. (2019b, January 22). *To Be + Adjective - Basic English Grammar Lesson* [Video]. YouTube. https://youtube.com/watch?v=YmnHYcK4F1I&si=DOIoAbSqX4DuD4P_

Yu, Z., & Gao, M. (2022). Effects of video length on a flipped English classroom. *Sage Open*, *12*(1), Article 245726365. https://doi.org/10.1177/21582440211068474

Zarrinabadi, N., Khodarahmi, E., & Shahbazi, H. (2021). On the effect of using a flipped classroom methodology on Iranian EFL learners' willingness to communicate. In N. Zarrinabadi, & M. Pawlak (Eds.). *New perspectives on willingness to communicate in a second language* (pp. 155-167). Springer. https://doi.org/10.1007/978-3-030-67634-6

Appendix 1

Target Grammar Topics at Run 2

Session 1	Simple Present tense (only with the verb “like”) (affirmative and negative statements)
Session 2	Simple Present tense (only with the verb “like”) (question form + affirmative and negative answer)
Session 3	to be verbs + adjectives (affirmative and negative statement + question form with affirmative and negative answer)
Session 4	to be verbs + nouns (jobs) (affirmative and negative statement + question form with affirmative and negative answer)
Session 5	Modal verb 'can' for expressing ability (affirmative and negative statements)
Session 6	Modal verb 'can' for expressing ability (question form with affirmative and negative answer)

Appendix II

List of Videos in Flipped Instruction

Session	Video Type	Video Title
1	teacher-made	*Simple present tense with the verb "like" (affirmative and negative statement)* (Modarres, 2024c).
	ready-made (YouTube video)	1. *Like, Likes, don’t like, doesn’t like - Present Simple Tense in English* (Woodward, 2019a). 2. *Present Simple Verb 'Like'* (Swain, 2020).
2	teacher-made	*Simple present tense with the verb "like" (question form with answer)* (Modarres, 2024d).
	ready-made (YouTube video)	1. *Like, Likes, don’t like, doesn’t like - Present Simple Tense in English* (Woodward, 2019a). 2. *Present Simple Verb 'Like'* (Swain, 2020, 2020).
3	teacher-made	*To be verbs plus adjectives (statement, question, and answer)* (Modarres, 2024e).
	ready-made (YouTube video)	1. *To Be + Adjective - Basic English Grammar Lesson* (Woodward, 2019b). 2. *HG 2 Unit 3 Lesson 2 Be Plus Adjectives* (Seed Learning, 2021).
4	teacher-made	*To be verbs plus nouns (jobs) (statement, question, and answer)* (Modarres, 2024f).
	ready-made (YouTube video)	1. *TO BE + Profession in English | Learn English TO BE | Basic English Less...* (Woodward, 2017). 2. *Lesson 1: Jobs/Present Tense of the verb "to be"/Statements / Pronouns (*Easy English with Evi, 2020).
5	teacher-made	*Can as a model verb for expressing ability (affirmative and negative statement)* (Modarres, 2024a).
	ready-made (YouTube video)	1. *Can Can't Cannot | Learn English Grammar | Basic English Lesson by Woodward (*Woodward, 2016a). 2. *Can / Can't | talking about our abilities | English grammar* (M.E.B English, 2023).
6	teacher-made	*Can as a model verb for expressing ability (question form with answer)* (Modarres, 2024b).
	ready-made (YouTube video)	1. *Questions with CAN - English Speaking Practice* (Woodward, 2016b). 2. *CAN: CAN´T EXPLANATION* (Marlene, 2020).