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Investigating the effects of flipped vocabulary learning via an online dictionary on EFL learners' listening comprehension

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Abstract

This study investigated the impact of flipped vocabulary learning on the listening achievement of EFL learners. The study participants included 60 English language learners selected based on their performance on the Michigan Test of English Language Proficiency and randomly assigned to experimental and control groups. The experimental group was taught based on flipped vocabulary learning, while the students in the control group received no such instruction. For treatment in the experimental group, the teacher taught the unknown and new vocabulary in the listening text from the TACTICS textbook using an online dictionary to flip the classroom. The teacher offered an online dictionary and encouraged learners to check out words, synonyms, and antonyms to become more familiar with new words. Before each listening class, students memorized 20 target words, prior to taking on the listening tasks. The obtained data were analyzed using the ANCOVA procedure. The study results demonstrated that the experimental group performed significantly better than the control group. Also, the findings suggested that flipped vocabulary learning can be used as an effective instructional tool to help learners improve their listening achievement. The theoretical and practical implications for learners, teachers, and syllabus designers are discussed.

Keywords: Flipped learning, Vocabulary, EFL learners, Listening comprehension

Introduction

Graham (2011) believes that listening is a source of frustration to learners and an area where it seems difficult to make progress. Also, According to Vandergrift (2004), listening is one of the most challenging skills for EFL students to acquire because it is the least explicit of the four language skills. Due to a lack of focus on listening skills, students have difficulty understanding listening messages. Some studies (Bonk, 2000; Graham, 2011; Gulec & Durmus, 2015) have focused on listening ability in teaching and learning. According to Buch (2001), listening comprehension is based on linguistic knowledge, such as vocabulary or grammar, and non-linguistic information, such as world knowledge, making it a complex process.

Learning vocabulary as an integral part of second language listening (Schmitt, 2008) has been recognized as one of the most contentious aspects of mastering a second language listening comprehension. Lexical knowledge is the most important aspect of language learning (Coady, 1997; Coady & Huckin, 1997). Li, He, and He (2012) and Wilson (2008) emphasize the importance of pre-teaching a specific vocabulary to aid learners' comprehension and reduce anxiety while listening. According to Bonk (2000), vocabulary comprehension is a consideration that is linked to listener characteristics. During pre-teaching of vocabulary, the learners become more familiar with the unknown words and especially comprehend the text, which they will listen to much better. According to Wilson (2008), it is better to pre-teach unknown words because these words may play an essential role in understanding the passage and the completion of the listening task. One of the best ways is to teach unknown words before teaching listening. It would be preferable if the learners were involved in vocabulary learning more independently and dynamically. The method of pre-teaching vocabulary could assist students in learning more words on their own, improving their language output through active learning.

The flipped classroom approach, on the other hand, is a common form of active and integrated learning that involves supplying and assisting learners with learning materials before class time. It uses a combination of face-to-face and online teaching strategies to engage them in substantive and communicative learning and important problem-solving (Bergmann & Sams, 2012; Kim, Park, Jang & Nam, 2017). According to Bergmann and Sams (2012), a flipped classroom is known by many titles, including flipped classroom, mixed learning, and simply the switch. The key and time-consuming aspect of teaching was achieved outside of the classroom in flipped classrooms by concentrating on student-centered lessons, allowing teachers to pay more attention to the lesson. According to Bergmann and Sams, this guidance is a comparatively recent teaching technique that aims to take the lecture outside of class, normally by any automated means, and bring the application tasks, formerly homework, into the classroom.

Although some studies have been done regarding listening comprehension in the EFL context, such as Namaziandost et al. (2019), Vaezi et al. (2003), less is known about to what extent pre-teaching vocabulary can influence listening and improve it in the EFL context, especially in Iran. Many Iranian EFL learners have problems with listening comprehension because of lacking strategies for dealing with listening tasks. Therefore, it is essential to continue to study whether flipped vocabulary learning has any other impact on the improvement of EFL's listening ability.

However, it has been found that teachers do not usually show any tendency to use pre-teaching class activities due to their unawareness of the advantages of pre-teaching vocabulary tasks, and shortage of instruments. The present research was done because of the lack of research in flipped vocabulary and its importance, especially in listening. The following question guided this study:

Does flipped vocabulary learning have any significant effect on listening achievement among Iranian intermediate female learners?

Flipped learning

The Flipped Learning Model is a solution to active learning's time constraints. A flipped classroom, according to Bergmann and Sams (2012), is one in which "what was

previously done in class is now done at home, and what was usually done as homework is now performed in class" (p. 13). The flipped classroom has revolutionized conventional educational approaches by encouraging students to study outside of the classroom and introducing homework into the classroom. Teachers incorporate differentiated instruction, problem/project-based learning, and research-based analysis in the flipped classroom, making learning essentially learner-centered (Bergmann & Sams, 2014). The previous studies present some advantages of flipped instruction, including improving academic performance (Missildine et al., 2013), increasing commitment (McLaughlin et al., 2014), increasing student's motivation and appealing to high cognitive abilities (Gilboy et al., 2015), and allocating more time for in-class tasks (Leis et al., 2015).

Unlike conventional teacher-centred teaching, in which students are viewed as hollow containers that passively consume knowledge (Betihavas et al., 2016), flipped classrooms are focused on the students rather than the teacher (Bergmann & Sams, 2012). As a result, several scholars conclude that student-centered learning theories (e.g., constructive learning, interactive learning) should be used more thoroughly (Betihavas et al., 2016; Lai & Hwang, 2016; Sohrabi & Iraj, 2016). Lee and Chang (2016) believed that classroom time for student-centered activities could also be enhanced by flipped learning. Furthermore, flipped classrooms enhanced students' participation, independence, accountability for learning, autonomy, teamwork, inspiration, and trust (Millard, 2012; Fulton, 2012; Pape et al., 2012; Driscoll & Petty, 2014).

Flipped learning and listening comprehension

The effects of the flipped classroom (FC) on EFL learners' listening comprehension were studied by Roth and Suppasetsee (2016). Its goal was to see how effective the flipped classroom was at improving the English listening skills of Cambodian pre-university students and to learn what the students thought about using the flipped classroom to improve English listening comprehension. This study's findings could be precious in directing EFL teachers' English listening teaching and improving EFL learners' English listening comprehension.

Yang and Lee (2018) examined the relationship between low-level EFL learners' listening abilities and flipped vocabulary learning in a Chinese context. The correlation between better communication abilities and flipped vocabulary learning in low-level EFL learners in a Chinese setting was explored in this research. They found a beneficial impact of flipped vocabulary learning on hearing development, with an average rise in listening test scores. The effects of flipped classrooms on Iranian EFL learners' listening comprehension were explored by Namaziandost et al. (2019). The Oxford Fast Placement Test (OQPT) was used to select 50 Iranian upper-intermediate students divided into two main groups: experimental and control. According to the findings, the experimental group outperformed the control group in the post-test. With the development of computer technology, a new branch of blended learning, flipped learning, has emerged to teach vocabulary before any skill. Ahmad (2016) investigated the connection between listening ability and flipped learning with junior Egyptian students at a university. He found that the flipped approach yields substantial results in enhanced listening skills of EFL students. Similarly, Roth and Suppasetsee (2016) believe that the flipped

technique can increase learners' communication abilities while also cultivating positive attitudes toward learning English.

Flipped vocabulary learning and listening

Vocabulary acquisition is at the heart of language learning, and language use (Jackson & Amvela, 2007) is related to knowledge and language acquisition (Blachowicz, Fisher & Watts-Taffe, 2005). Teaching and studying second language (L2) vocabulary has been a major focus for many applied linguistic scholars and language teachers after decades of indifference and little attention (Barcroft, 2004; De Carrico, 2001; Read, 2000).

Before teaching listening, one of the main methods that can be employed is to introduce unknown vocabulary. Wilson (2008) believes that it is necessary to pre-teach unknown vocabulary since they can be crucial in understanding the passage and performing the listening task. Some researchers (Li, 2008; Nation, 2004; Teng, 2014) have proven that listening effectively improves learners' vocabulary. Mihara (2015) noted that it is useful for students to understand spoken language because it allows them to hear the target words.

Methodology

Design

The researchers used a pre-test, post-test, quasi-experimental design in this study, with participants drawn from intermediate language classes based on convenience sampling.

Participants

A sample of 70 Iranian EFL learners (female) at an intermediate level of language proficiency was selected based on convenience sampling to participate in this research. They were selected through convenient sampling, where the researcher's convenience is considered a significant criterion used in sample selection (Dornyei, 2007). The native language of all learners was Persian, with the same socio-cultural background. The same instructor instructed them under the same conditions. They studied English for three years in a private English institute and had the age range of 15 to 18 at the study time. The researcher checked the participants' level of proficiency MTELP (Michigan Test of English Language Proficiency). All participants had equal levels of language proficiency regardless of their educational and linguistic backgrounds, as shown by a proficiency test. Ten students were excluded from the study due to their different levels of language proficiency. As a result, 60 students were selected; they were randomly separated into two groups, one experimental and one control group. They attended regular two-hour classes twice a week and the treatment sessions lasted 45 min of the classes' time. There were 30 students in each group. Regarding ethical consideration, written consents were obtained before the study.

Instruments and materials

Michigan test of english language proficiency (MTELP)

In order to ensure the homogeneity of the participants in terms of their level of language proficiency, an MTELP was used in this study. MTELP is one of the accepted and recognized tests which can assess ESL/EFL learners' level of language proficiency.

Pre and post- vocabulary tests

Students took a pre-intermediate and intermediate level English vocabulary in use exam to estimate their vocabulary size and schedule the last vocabulary items needed for treatment. It was used to measure the students' first-hand understanding of vocabulary. The English vocabulary in use pre intermediate and intermediate level test, released by Cambridge University Press in 2008, was used to create the pre-test for this study. The Cambridge test was retrieved from [www.Cambridge.org/elt/in use](http://www.cambridge.org/elt/in_use) (http://www.gimnazijakarlovac.hr/system/files/000/000/489/Test_your_English3.pdf).

English vocabulary in usage intermediate and pre-intermediate level tests were used to determine the level of vocabulary knowledge of the participants at the start of this study (pre-test). After the training session, both in the control and experimental groups, a post-test was given to determine the students' short-term improvement.

Pre and post listening tests and listening practice materials

This study used materials from Richards (2004) *Tactics for listening to test and practice*. According to Richards (2004), *Tactics for Listening* is intended for pre-intermediate students who have previously studied English but need further practice understanding everyday conversational language. It can be used as the main text for a listening course. The topics have been chosen for their conversation frequency and interest to learners. Essential listening skills practiced throughout the text include listening for keywords, details, and gist; listening and making inferences; listening for attitudes; listening to questions and responding; and recognizing and identifying information.

For the pre- and post-listening testing, two tests from *Developed Tactics* were used. The internal validity of repeated measurements of similar listening portions can be verified by using this book. This study used two units from Richards (2004). *Listening Tactics* is a three-level set of listening manuals for ESL learners. It has been revised and expanded to provide increased listening and a new focus on developing test-taking skills. The second level of the listening tactics series focuses on establishing techniques for pre-intermediate and intermediate English learners who have already studied the language but need more practice identifying daily conversational language.

Online dictionary

Thanks to the development of online dictionaries, researchers now have a tool to observe students' look-up behavior, such as whether they look up a word and how often they do so (Hulstijn, 2000). Numerous studies have demonstrated that online dictionaries improve word retention (Al-Seghayer, 2001; Laufer et al., 2004). According to Laufer and Hill (2004), utilizing an electronic dictionary has a positive effect on incidental vocabulary learning. Students may choose between multiple forms of dictionary information, such as L1 translation, L2 synonym, and pronunciation, which might have contributed to their study's higher recall outcomes.

The best online dictionaries are available on the internet, which use a number of methods to help learners understand words in highly reliable and creative ways. The Cambridge Online Dictionary was chosen by the researcher for learners to examine new terms, synonyms, and antonyms in order to become more comfortable with new words. It allows learners to search using words, characters, or text and various meanings, a

thesaurus, intransitive verbs, voice pronunciations, and a translator that works with common languages such as French, German, and Greek. The Cambridge Online Dictionary is a free web-based dictionary developed by the University of Cambridge Press.

Procedure

At the beginning of the study, 70 learners were chosen at an intermediate stage of proficiency. A Michigan measure of English language proficiency (MTELP) homogenized the participants. As a result, ten students who scored more than one standard deviation above or below the mean were eliminated from the study, leaving 60 homogeneous participants for this research. Prior to the procedure, the participants were given a pre-test to check that they had no prior knowledge of the listening and to reduce the impact of prior information. A vocabulary test was also offered as a pre-test to determine the learners' vocabulary skills. The participants attended their classes twice a week, each lasting 45 min. In each lesson, these two classes had the same instructor and the same texts for instruction. Every session started with the learning of 20 new terms. Each group of participants received their treatment under the following conditions: flipped vocabulary learning or traditional method. Furthermore, units one and two from Richards (2004) textbook were used to teach listening in both classrooms. Each unit included five sections. The first section of the basic tactics book was Getting Ready, which introduced the unit's topic and presented key vocabulary for the unit listening tasks. This section required the use of an online dictionary in the classroom. The next three sections, Listening 1, Listening 2, and Listening 3, provided task-based, graded listening practice.

The teacher used the flipped technique to teach the unknown and new vocabulary found in the listening text in the experimental group. Before class, students should use an online dictionary to learn new words with the flipped vocabulary learning method. The Cambridge Online Dictionary was used for learning new words and was also provided to students prior to listening practice. Before beginning the session, the teacher completed an oral or written assessment to ensure that all of the new words were found and learned utilizing the online dictionary. The teacher ensured that students found and studied 20 target words for each listening practice section before class using the flipped method. Before introducing each listening task, the students used this online dictionary to look up the definition, antonym, synonym, and part of speech of new words. The teacher would ask about them in the next class. We mostly focused on learners' bottom-up listening skills because listeners' lexical and grammatical competence in a language provides the basis for bottom-up processing. The students scanned for familiar words, and grammatical knowledge was used to work out the relationship between elements of sentences. In the classroom, both groups were engaged in doing the following activities to develop their bottom-up listening skills: Identify the referents of pronouns in an utterance, recognize the time reference of an utterance, distinguish between positive and negative statements, identify keywords that occurred in a spoken text and identify which modal verbs occurred in a spoken text.

The members of the control group received a listening section through traditional methods. This means the teacher played audio and invited the students to answer the questions using prior knowledge, guessing the meaning of unknown words, or any other strategy they had found beneficial previously. The participants were unaware of

the flipped vocabulary acquisition strategy because they were unaware of it and had not been taught how to use it; yet, they may have utilized it subconsciously. After listening to the audio, the teacher wanted students to transcribe some of it, answer some questions, and describe some terms. The students were required to complete them depending on their background knowledge, or the teacher would play it multiple times.

The control and experimental groups were taught by the same instructor who went over the new material in class, participated in Question and Answer activities, and had individual and group listening discussions. The study lasted four weeks, with eight sessions dedicated to the treatment, one week to the Michigan test and the pretest, and two weeks to the posttests. However, it should be noted that the experiment received took about 45 min of regular two hour weekly class time. A post-test was given at the end of the experiment. The participants' listening ability and vocabulary were assessed using multiple-choice questions. The data collected was subsequently subjected to statistical analysis.

Data analysis

The data obtained from the tests were analysed using SPSS (20). The post-test was administered after eight sessions. The mean, standard deviation, and variance were calculated for the two groups in order to compare how far students had progressed through two alternative sets of instructions. To answer the research question, each group's pre-test and post-test listening and vocabulary means were compared using a paired-samples t-test and a Wilcoxon Signed Ranks test (Table 1).

Results

This study investigated whether there are any significant effects of flipped vocabulary learning on listening achievement among EFL learners. To this end, the participants' scores on the listening achievement posttest were compared. In order to examine which group showed a more significant increase from the pre-test to the post-test in listening achievement, it was necessary to compare the pre-test and post-test means of the groups with one another. The mean MTELP scores of the groups were compared to ensure homogeneity. Table 2 shows the descriptive statistics for the two groups in terms of MTELP scores. An independent-samples t-test was used to compare the mean MTELP scores of the two groups. The data must meet the normality assumption in order to conduct the t-test; consequently, the normality of the data was tested by computing the skewness and kurtosis ratios (i.e., by dividing the skewness/kurtosis values by the related standard errors) of the data based on Table 2. The data

Table 1 Distribution of participants

| | Experimental group | Control group |
|--------------|--------------------|---------------|
| Age range | 15–18 | 15–18 |
| Level | Intermediate | Intermediate |
| Total number | 30 | 30 |

Table 2 Descriptive statistics

| Group | N | Min | Max | Mean | SD | Skewness | | Kurtosis | |
|---------------------|----|-------|-------|---------|---------|----------|------|----------|------|
| | | | | | | SE | SE | | |
| <i>Experimental</i> | | | | | | | | | |
| MTELP | 30 | 35.00 | 49.00 | 41.2000 | 4.00345 | .430 | .427 | -.433 | .833 |
| Valid N (listwise) | 30 | | | | | | | | |
| <i>Control</i> | | | | | | | | | |
| MTELP | 30 | 35.00 | 48.00 | 40.4000 | 3.20129 | .657 | .427 | .145 | .833 |
| Valid N (listwise) | 30 | | | | | | | | |

Table 3 Independent Samples Test

| | Levene's test for equality of variances | | t-test for equality of means | | | | |
|-----------------------------|---|------|------------------------------|--------|-----------------|-----------------|---------------|
| | F | Sig. | T | df | Sig. (2-tailed) | Mean Difference | SE Difference |
| <i>MTELP</i> | | | | | | | |
| Equal variances assumed | 1.727 | .194 | .855 | 58 | .396 | .80000 | .93588 |
| Equal variances not assumed | | | .855 | 55.324 | .396 | .80000 | .93588 |

fulfilled the normality assumption because no skewness/kurtosis ratio was greater than 1.96, allowing the t-test to be used as a parametric test.

Table 3 presents the t-test results indicating no significant difference between the control and experimental groups in terms of MTELP mean scores; $t(58) = 0.855$, $p > 0.05$. Therefore, it is concluded that there is no significant difference between the two groups in terms of English proficiency.

At the beginning of each session, 20 new words were taught in both groups. A multiple-choice question test measured the participants' listening achievement and their vocabulary after receiving their relevant treatment. To compare the pre- and post-test listening and vocabulary means of each group, a paired-samples t-test and Wilcoxon Signed Ranks test were used. It should be noted that t-test is a parametric test for which normality assumption should be met. Therefore, before running t-test, the normality of the data was checked by computing skewness and kurtosis ratios from Table 4. Except for post-test listening scores in the control group, all the skewness and kurtosis ratios turned out to be within ± 1.96 , hence, meeting the normality assumption. Therefore, a paired-samples t-test was run to compare the vocabulary and listening pre-test and post-test means in the experimental group as well as to compare the vocabulary pre-test and post-test means in the control group. Then, Wilcoxon Signed Ranks test as a non-parametric test (i.e., not needing t meet normality assumption) was run to compare the listening pre-test and post-test means in the control group.

Table 4 demonstrates that some increase exists from pre-test to post-test in both groups' vocabulary and listening mean scores. In order to check the significance of these increases, the paired-samples t-test and Wilcoxon Signed Ranks test results in the following tables were checked.

Table 4 Descriptive Statistics

| Group | N | Min | Max | Mean | SD | Skewness | | Kurtosis | |
|---------------------|----|-------|-------|---------|---------|----------|------|----------|------|
| | | | | | | SE | SE | | |
| <i>Experimental</i> | | | | | | | | | |
| Pre-test. Vocab | 30 | 38.00 | 47.00 | 41.4667 | 2.56949 | .681 | .427 | -.793 | .833 |
| Post-test. Vocab | 30 | 40.00 | 50.00 | 45.0667 | 2.21178 | .258 | .427 | .637 | .833 |
| Pre-test. List | 30 | 12.00 | 19.00 | 15.8667 | 1.92503 | -.512 | .427 | -.719 | .833 |
| Post-test. List | 30 | 15.00 | 20.00 | 17.6000 | 1.81184 | -.024 | .427 | -1.252 | .833 |
| Valid N (listwise) | 30 | | | | | | | | |
| <i>Control</i> | | | | | | | | | |
| Pre-test. Vocab | 30 | 36.00 | 49.00 | 41.1000 | 3.10006 | .570 | .427 | .127 | .833 |
| Post-test. Vocab | 30 | 38.00 | 50.00 | 43.6000 | 3.10284 | .298 | .427 | -.430 | .833 |
| Pre-test. List | 30 | 12.00 | 19.00 | 15.1667 | 1.91335 | -.064 | .427 | -.902 | .833 |
| Post-test. List | 30 | 15.00 | 20.00 | 18.8667 | 1.19578 | -1.282 | .427 | 2.263 | .833 |
| Valid N(listwise) | 30 | | | | | | | | |

Table 5 Paired Samples Correlations

| Group | N | Correlation | Sig |
|------------------------------------|----|-------------|------|
| Experimental | | | |
| <i>Pair 1</i> | | | |
| Pre-test. Vocab & Post-test. Vocab | 30 | .820 | .000 |
| <i>Pair 2</i> | | | |
| Pre-test. List & Post-test. List | 30 | .864 | .000 |
| Control | | | |
| <i>Pair 1</i> | | | |
| Pre-test. Vocab & Post-test. Vocab | 30 | .861 | .000 |
| <i>Pair 2</i> | | | |
| Pre-test. List & Post-test. List | 30 | .688 | .000 |

Before running paired-samples t-test, it is important to make sure there is a high correlation between the pre-test and post-test scores hence indicating the scores on both pre-test and post-test are matched and go together. As per Table 5, all the correlations are significant ($p < 0.05$), showing a significant go-togetherness.

The t-test and Wilcoxon Signed Ranks test results in Tables 6 and Table 7 demonstrate that significant improvement has happened from pre-test to post-test in both experimental and control groups in terms of both listening and vocabulary scores ($p < 0.05$). Given these results, it is not clear whether the treatment in either group was more effective than the other. Therefore, it was decided to compare the experiment and control groups in terms of their mean vocabulary and listening scores on the post-test to see which treatment (i.e. (1) flipped vocabulary learning, (2) traditional method) had a significant effect on listening and vocabulary achievement of the students in the experimental and control groups.

To compare the post-test of the experimental and control groups, an independent samples t-test, ANOVA, or their non-parametric equivalents could be used; however, because the two groups showed some initial mean differences on the pre-test

Table 6 Paired Samples Test

| Group | Paired Differences | | | t | df | Sig. (2-tailed) |
|------------------------------------|--------------------|---------|---------|---------|----|-----------------|
| | Mean | SD | SE Mean | | | |
| Experimental | | | | | | |
| <i>Pair 1</i> | | | | | | |
| Pre-test. Vocab – Post-test. Vocab | –3.60000 | 1.47625 | .26952 | –13.357 | 29 | .000 |
| <i>Pair 2</i> | | | | | | |
| Pre-test. List – Post-test. List | –1.73333 | .98027 | .17897 | –9.685 | 29 | .000 |
| Control | | | | | | |
| <i>Pair 1</i> | | | | | | |
| Pre-test. Vocab – Post-test. Vocab | –2.50000 | 1.63475 | .29846 | –8.376 | 29 | .000 |

Table 7 Wilcoxon Signed Ranks Test Results

| Group | Post-test. List – Pre-test. List | | |
|------------------------|----------------------------------|-----------|--------------|
| <i>Control</i> | | | |
| Z | –4.814 ^b | | |
| Asymp. Sig. (2-tailed) | .000 | | |
| Negative ranks | N | Mean rank | Sum of ranks |
| | O ^a | .00 | .00 |

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks

Table 8 Levene’s test of equality of error Variances a dependent variable: post-test. vocab

| F | df1 | df2 | Sig |
|-------|-----|-----|------|
| 1.090 | 1 | 58 | .301 |

Tests the null hypothesis that the error variance of the dependent variable is equal across groups

^a Design: Intercept + Pre-test. Vocab + Group

according to the descriptive tables above, it was necessary to run Analysis of Covariance (ANCOVA) to account for the initial differences on the pre-test.

The normality of the data was already checked, and except for the post-test listening scores in the control group, all skewness and kurtosis ratios were within 1.96, indicating that the data met the normality assumption. Therefore, one ANCOVA (Parametric) was run to compare the vocabulary and listening pre-test and post-test means in the experimental group as well as to compare the vocabulary post-test means of the control and experimental groups. Then, non-parametric (Quade’s) ANCOVA was run to compare the listening post-test means of the control and experimental groups together.

Another assumption of parametric ANCOVA is the homogeneity of variances, which was tested using Levene’s test. The findings in Table 8. reveal that the difference is not significant ($p > 0.05$), implying that the assumption of homogeneity of variances was met.

The check results on the assumption of homogeneity of regression slopes and the main parametric ANCOVA results are shown in Table 9. The third row indicates that the assumption of homogeneity of regression slopes is met ($p > 0.05$).

Table 9 Tests of Between-Subjects Effects (Parametric ANCOVA)

| Dependent Variable: Post-test. Vocab | | | | | | |
|--------------------------------------|-------------------------|----|-------------|---------|------|---------------------|
| Source | Type III Sum of Squares | df | Mean Square | F | Sig | Partial Eta Squared |
| Corrected Model | 331.788 ^a | 2 | 165.894 | 77.798 | .000 | .732 |
| Intercept | 35.580 | 1 | 35.580 | 16.686 | .000 | .226 |
| Group * Pre-test. Vocab | 2.777 | 1 | 2.777 | 1.309 | .257 | |
| Pre-test. Vocab | 299.522 | 1 | 299.522 | 140.464 | .000 | .711 |
| Group | 20.586 | 1 | 20.586 | 9.654 | .003 | .145 |
| Error | 121.545 | 57 | 2.132 | | | |
| Total | 118,380.000 | 60 | | | | |
| Corrected Total | 453.333 | 59 | | | | |

a. R Squared = .732 (Adjusted R Squared = .722)

The fourth row shows that the groups were different on the pre-test ($p < 0.05$), and finally, the fifth row demonstrates that the groups are significantly different on the post-test; Group $F(2.57) = 9.65$, $p < 0.05$, partial eta squared = 0.145 large effect size. Table 10 presents the post-test means of the two groups after being adjusted by taking into account the initial differences on the pre-test (i.e., covariate effect), showing that the experimental group has a higher post-test vocabulary mean. As a result, it is concluded that flipped vocabulary learning has a significant effect on vocabulary achievement among Iranian learners.

Table 11 demonstrates the results of the Non-parametric Quade’s ANCOVA on comparing the experimental and control groups in terms of their listening post-test means. The third row demonstrates that the groups are significantly different on the listening

Table 10 Adjusted Post-test Means

| Dependent Variable: Post-test. Vocab | | | | |
|--------------------------------------|---------------------|------|-------------------------|-------------|
| Group | Mean | SE | 95% Confidence Interval | |
| | | | Lower Bound | Upper Bound |
| Experimental | 44.920 ^a | .267 | 44.386 | 45.455 |
| Control | 43.746 ^a | .267 | 43.212 | 44.281 |

^a Covariates appearing in the model are evaluated at the following values: Pre-test. Vocab = 41.2833

Table 11 Tests of Between-Subjects Effects (Non-parametric Quade’s ANCOVA)

| Dependent Variable: Unstandardized Residual | | | | | | |
|---|-------------------------|----|-------------|--------|-------|---------------------|
| Source | Type III Sum of Squares | df | Mean Square | F | Sig | Partial Eta Squared |
| Corrected Model | 4020.988 ^a | 1 | 4020.988 | 37.843 | .000 | .395 |
| Intercept | .000 | 1 | .000 | .000 | 1.000 | .000 |
| Group | 4020.988 | 1 | 4020.988 | 37.843 | .000 | .395 |
| Error | 6162.692 | 58 | 106.253 | | | |
| Total | 10,183.679 | 60 | | | | |
| Corrected total | 10,183.679 | 59 | | | | |

^a R Squared = .395 (Adjusted R Squared = .384)

Table 12 Descriptive statistics

| Group | N | Min | Max | Mean | SD | Skewness | | Kurtosis | |
|---------------------|----|-------|-------|---------|---------|----------|------|----------|------|
| | | | | | | SE | SE | | |
| <i>Experimental</i> | | | | | | | | | |
| Pre-test. List | 30 | 12.00 | 19.00 | 15.8667 | 1.92503 | -.512 | .427 | -.719 | .833 |
| Post-test. List | 30 | 15.00 | 20.00 | 18.8667 | 1.19578 | -1.282 | .427 | 2.263 | .833 |
| Valid N (listwise) | 30 | | | | | | | | |
| <i>Control</i> | | | | | | | | | |
| Pre-test. List | 30 | 12.00 | 19.00 | 15.1667 | 1.91335 | -.064 | .427 | -.902 | .833 |
| Post-test. List | 30 | 15.00 | 20.00 | 17.6000 | 1.81184 | -.024 | .427 | -1.252 | .833 |
| Valid N (listwise) | 30 | | | | | | | | |

post-test; Group F (1.58) = 37.84, $p < 0.05$, partial eta squared = 0.395 large effect size. Table 12 presents the two groups’ listening post-test means, showing that the experimental group has a higher post-test listening mean. As a result, it is concluded that flipped vocabulary learning has a significant effect on listening achievement among Iranian learners, and the control group receiving a traditional method of instruction shows a less significant gain in their listening scores. It should be noted that the paired-samples t-test and Wilcoxon Signed Ranks test results already showed that in both experimental and control groups significant improvement happened in their vocabulary and listening mean scores. However, when comparing the achievements in listening and vocabulary scores, the experimental group treatment was more effective in terms of vocabulary and listening achievement.

Discussions and conclusion

The results indicated significant differences in the effects of flipped vocabulary learning on Iranian intermediate EFL learners’ listening comprehension. The findings of this study are partially in line with the results of the previously reviewed studies. These findings support Davies et al. (2013) who claim that the flipped classroom improves students’ performance by creating an environment consistent with their preferences. In fact, the results showed that vocabulary flipped learning helps improve students’ listening comprehension.

Based on the findings of this study, it is clear that flipped techniques have a significant positive effect on enhancing learners’ listening. It’s possible that this result is attributable to the fact that flipped learning necessitates learners’ active participation in the learning process. It may also make the learning assignment before class more difficult, necessitating additional teacher assistance in order for the learner to accomplish the work. Since flipped learning provides some kind of help to learners before class, flipped vocabulary learning should be included in the EFL syllabus, in which teachers should try to match their teaching techniques with the students’ needs.

The present study’s findings align with those of Yang and Lee (2018) who argued that flipped vocabulary learning is necessary for listening achievement among low-level learners. This study also corroborated Roth and Suppasetserree (2016) in which they focused on the effects of the flipped classroom (FC) on EFL learners’ listening

comprehension and other studies (Basal, 2015; Roth & Suppasetsee, 2016) that have also documented the positive impacts of the flipped instruction on student learning generally.

This study's findings support Wilson's (2008) assertion that it is better to pre-teach unknown terms because they may be critical to the comprehension of the passage as well as completion of the listening assignment. As a result, the students can participate well during class activities and reinforce what they have studied before class. The efficiency of flipped learning over the other types may be related to the nature of such strategies. As their name suggests, flipped learning requires conscious review and study of the lesson before the class. Moreover, teachers incorporate differentiated instruction, problem/project-based learning, and research-based analysis in the flipped classroom, making flipped learning essentially learner-centered (Bergmann & Sams, 2014).

The authenticity concept is founded on the idea that students gain from working on real-life projects. They may take important actions to further their comprehension and teachers should teach students to become independent learners equipped for real-world tasks. Such a learning environment can be built by flipped classrooms. The findings of this study can be useful for language teachers looking to increase the interaction and participation of EFL learners in their classrooms.

Flipped learning can help students prepare for the classroom. The teacher provides resources and principles to the pupils, allowing them to work on them in an internal or interpersonal context. Teachers save class time by offering the materials to the students during flipped instruction before class, resolving the learner's problem concerning learning new words during this time. Classroom sessions will teach students how to listen as they approach new and unfamiliar terms; they will also be familiar with the topic and listening techniques.

This study's findings suggest that flipped classrooms can assist teachers in improving their learning outcomes in the context of technology integration and the significant differences in learning outcomes between students taught using flipped and traditional teaching methodologies. It can be concluded that the flipped vocabulary classroom has great potential for improving the listening achievement of learners in an EFL context. As a result, it can assist students in gaining a greater benefit from the instructors' comments/advice given on their work. This also has the benefit of reducing class time and increasing learner interactions. As a result of this approach, students will take more responsibility for their own learning. They become more self-directed and inspired than in a traditional classroom setting. The findings of this study showed the benefits of using an online dictionary in a flipped classroom, which gave students adequate time to absorb and review new vocabulary several times. The students were able to participate in collaborative learning using an online dictionary. In this study, flipped vocabulary learning freed up class time for collaborative learning activities that employed learners' already processed vocabulary knowledge to improve bottom-up listening abilities. This is in line with Samiei and Ebadi (2021) findings from a flipped classroom study, which indicated that students concentrated on self-directed learning and worked at their own pace, making them more comfortable working together and collaboratively to solve the problems. Having online access to the vocabulary needed for accomplishing listening tasks regardless of time or distance is another essential characteristic of flipped vocabulary learning

via online dictionaries, which leads to increased motivation to learn and time savings. As a result, this method could be described as learner-centered, as it promotes learners' independence and autonomy rather than relying on a teacher.

Teachers should be aware of technology-enhanced tools for developing language learning and guide students on how to use them in pre-classroom activities. Using technological tools (dictionaries, applications, etc.) in the flipped classroom context can be efficient. They should introduce learners to various types of electronic devices and try to incorporate some additional guidelines to compensate for the limitations of electronic dictionaries in the development of new language learning. Teachers, curriculum designers, and students should become more aware of the relevance of pre-class activities that promote learning. A limitation of this study was the proficiency level of the participants. The researcher was confined to choosing her sample from among intermediate-level learners. Therefore, future studies should use participants from all proficiency levels. This study was also limited by its sample size; a larger sample should be considered in future studies using instruments such as interviews and questionnaires to gain more comprehensive results.

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Competing interests

The authors declare that they have no competing interests.

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