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Effect of Static Infographics on Vocabulary Gain and Retention of Iranian Intermediate EFL Learners

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Abstract

Infographics are visual representations of information intended to be presented quickly and clearly. This study examined the impact of static infographics on vocabulary acquisition and retention among Iranian intermediate English as a Foreign Language (EFL) learners. Sixty learners from the Bayan Institute in Abadan, Iran, were divided into a Static group (SG) and a Control group (CG) through convenience sampling, with classes conducted online via Jitsi Meet. A teacher-made vocabulary pretest based on the course content was given to both groups before instruction. While both groups received new vocabulary from the Touchstone book, the SG learned through static infographics featuring pictures and texts, whereas the CG used traditional methods. Finally, a posttest was administered to both groups and three weeks later, a delayed posttest was conducted to assess vocabulary retention. All tests were teacher-made and conducted via Digi Survey, with their validity confirmed by two TEFL experts from Islamic Azad University in Abadan, Iran. Results showed that both methods improved vocabulary acquisition and retention, but the SG significantly outperformed the CG. Students who received vocabulary instruction through static infographics demonstrated significantly better vocabulary gains and retention than those taught using traditional textbook methods. The findings are helpful for language instructors because this type of study leads to more effective teaching methodologies and better criteria for selecting materials.

Keywords:
EFL learners, Static infographics, Visualization, Vocabulary gain, Vocabulary retention

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Introduction

One of the key elements of learning and teaching a new language is vocabulary (Kabooha & Elyas, 2015). Vocabulary has been considered an important component and a reliable indicator of second language (L2) proficiency. According to Barrot (2013) and Birch (2014), the presence or absence of vocabulary influences success or failure when learning a new language. Krishnan and Yunus (2018) also claimed that vocabulary knowledge is necessary for learning a second language. Second-language learners need to expand their vocabulary because limited vocabulary knowledge hinders communication. In addition, learning vocabulary is crucial to being proficient in a second language, as a solid command of words is essential for acquiring basic language skills, including speaking, listening, reading, and writing (Hao et al., 2021).

Language instruction and learning have evolved in the educational context compared to the past. Technology in the academic setting is extremely effective for delivering, storing, and retrieving information. The traditional educational system has undergone significant changes due to technological advancements. Computers and technology offer a range of possibilities for presenting material, making it more engaging and productive for improvement. Today, technology is an effective educational tool in teaching and learning settings. Using technology for teaching can boost students' interest and motivation (Linik, 2012).

Infographics first appeared in the latter half of the 20th century and were applied in many settings (Toth, 2013). Teachers can support learning in classrooms using infographics as instructional aids. Simplifying new input to make it visually appealing can help the second language learning process. Infographics are visually attractive and understandable combinations of text and visual representations such as charts, graphs, diagrams, and photographs (Parkinson, 2016). Recently, infographics have been utilized as visual learning tools to support the learning and retention of information, and they are valuable tools because they summarize information using a combination of text and images.

Vocabulary is one of the most important aspects of effective communication in second or foreign language acquisition (Al-Khasawneh, 2012; Ungu & Qathrunnada, 2024). However, learning new words could be overwhelmingly complex for some language learners. For example, even after learning English for almost six years, most Iranian English as a Foreign Language (EFL) learners still struggle to retain and recall the words they have learned. It is worth noting that vocabulary acquisition is one of the areas that pose a challenge for these students. Additionally, they face difficulties with comprehensive vocabulary, which involves a deep understanding of word meanings, ultimately affecting their overall vocabulary acquisition (Teng, 2016). Therefore, in recent years, more attention has been given to finding effective methods of teaching

vocabulary. Traditional methods of learning EFL vocabulary consume a significant amount of time and drain students' energy. According to research by scholars such as Coniam and Wong (2004), incorporating technology into language learning creates a conducive and secure learning environment where learners feel comfortable with the learning process. A positive learning atmosphere is necessary for effective teaching because it reduces the emotional barriers that learners may have.

Therefore, this study is significant in that it demonstrates infographics-based instruction as a potential learning tool for Iranian intermediate EFL learners, a topic that has been researched. Intermediate-level learners represent a substantial portion of the EFL student population. Therefore, this study focused on this group due to their accessibility and to ensure the findings would be relevant to a large number of language learners. The findings of the current study can assist teachers in planning ways to enhance learners' interest and motivation. The study highlights the importance of incorporating infographics into Iranian curricula and educational settings to enhance student learning outcomes. The findings of this study can contribute to the growing body of knowledge on utilizing static infographics in vocabulary learning. The study may have some implications for implementing different infographics in second or foreign language classes. Furthermore, this study may extend our understanding of using this innovative technology effectively in teaching and learning English.

Many studies have been conducted in Iran on vocabulary gain and retention (Elekaei et al., 2019; Elekaei et al., 2020; Heidari Tabrizi & Onvani, 2018; Jafari & Chalak, 2016). Most of these studies have focused on using vocabulary podcasting tasks and employment applications, such as Telegram or WhatsApp, or concentrating on learners' perceptions and attitudes toward using software or applications to improve vocabulary gain and retention. There are not enough studies on the role of infographics in vocabulary gain and retention, especially among Iranian intermediate EFL learners. Therefore, the present study examined the effect of static infographics on vocabulary gain and retention of Iranian intermediate EFL learners to fill the gap. Therefore, the following research questions were posed:

Do static infographics significantly affect Iranian intermediate EFL learners' vocabulary gain and retention?

Are there any significant differences between static infographics and textbook-based teaching on vocabulary gain and retention of Iranian intermediate EFL learners?

Literature review

Folse (2004) emphasized that mastering vocabulary is essential for learning a new language. Expanding one's vocabulary is a key to achieving proficiency in a foreign language. In contrast, a limited vocabulary may create substantial challenges for effective communication. Therefore, acquiring vocabulary is essential for learning a second language. As educators have recognized the significance of vocabulary in language

acquisition, there has been a growing emphasis on vocabulary instruction (Hunt & Beglar, 2005). It is also important to highlight that vocabulary should not be overlooked due to its crucial role in mastering a new language (Hoshino, 2010).

Data visualization is one method of information presentation that is the quickest and most straightforward method of conveying meaning to others (Cukier, 2010). Visualization is a crucial constituent of communication that visualizes data into effective graphics (Ware, 2012). According to Few (2004), data visualization refers to any graphic representation that examines or communicates data across various disciplines, making it easier to understand detailed information. Silva et al. (2011) asserted that data visualization is more effective than just presenting text alone.

According to Moorefield-Lang (2011), infographics are visual representations of information that combine text and graphical constituents. Some infographics aim to support a perspective, persuade an audience, and develop an argument (Abilock & Williams, 2014). Infographics, as a modern technology, can be used as a promising technique in EFL classes. Infographics are used to convey and communicate a message, simplifying the presentation of data. Infographics present too much information with little explanation (Yildirim, 2016). People use infographics nowadays for various purposes, including education, trade, and mass media. For instance, in advertising, an infographic is often used to create a poster that condenses much information into a single sheet of paper. In the field of education, infographics are also used to help teachers explain concepts to students. Some educators believe infographics could be a valuable visual aid in the classroom (Nhan, 2023).

According to Islamoglu et al. (2015), the advantages of using infographics are (a) improving the comprehension of information, (b) enhancing critical thinking, and (c) improving the retention and recall of information. Lamb and Johnson (2014) suggested that using infographics organizes ideas and converts raw data into meaningful information. Infographics represent exemplary visual aids that enhance learning and promote information retention. Damyanov and Tsankov (2018) claimed that the focus is on learners' motivation and collaborative learning while designing and creating infographics. Utilizing infographics stimulates higher-level cognition and develops cognitive abilities (Damyanov & Tsankov, 2018).

Numerous studies have focused on the effect of infographics on developing EFL learners' skills (Afrian, 2019; Kongwat & Sukavatee, 2019; Manowong, 2017; Rezaei & Sayadian, 2015; Supraba & Silvana, 2020; Tetri, 2025; Yildirim, 2016). Manowong (2017) found that utilizing infographics could facilitate learning English and increase the motivation of EFL learners in educational contexts. Yildirim (2016) conducted an instance case study at Atatürk University in Turkey to determine the effects of using infographics for educational purposes. The participants were assigned tasks throughout the semester and were required to prepare five presentations. Then, an infographics reader survey was used to collect the participants' preferences regarding infographics. The study

revealed that the infographics improved learning and were more instructive than the text materials.

Kongwat and Sukavatee (2019) conducted a study examining the effects of infographics on reading comprehension. Their findings indicated that infographics can significantly enhance students' understanding and engagement in EFL classrooms. Supraba and Silvana (2020) studied the effects of summarizing using infographics on EFL learners' reading comprehension. The results showed that infographics motivated and enabled them to summarize reading topics, stimulated their engagement in the learning process, and helped them be active in a collaborative atmosphere. In recent years, there has been an increasing amount of literature (Al-Mohammadi, 2017; Dahmash et al., 2017; Ibrahem & Alamro, 2021; Locoro et al., 2017; Tavanapour et al., 2023) on using infographics in ESP classes. Dahmash et al. (2017) examined the impact of using infographics in teaching linguistics, including a group of 186 linguistics students who utilized infographics as a key method for data collection. Moreover, a questionnaire was distributed to evaluate the students' attitudes after they completed their infographic designs. Analyzing the collected data revealed that the students had positive attitudes toward using infographics. Additionally, the majority were motivated to integrate infographics into their teaching and learning processes, gaining advantages in enhanced critical thinking skills and collaborative learning during the design process of infographics.

It has been demonstrated that infographics facilitate learning (Aldalalah, 2020; Alkhawaldeh & Khasawneh, 2020; Alqudah et al., 2019; Amin et al., 2014; Eremkina et al., 2022; Maamuujav et al., 2020; Nhan, 2023; Tavanapour et al., 2022; Yarbrough, 2019). Alkhawaldeh and Khasawneh (2020) investigated the impact of an infographic-based training program on enhancing motor memory among EFL learners. This study was conducted using a semi-experimental research design. The data collected revealed a significant difference in visual-motor memory skills between the experimental group (EG) and the control group (CG) during the posttest. The results indicated that infographics enhanced participants' visual-motor memory skills in learning English as a second language.

Method

Design and Context

The current study employed a quasi-experimental pretest-posttest design. Sixty Iranian EFL learners from the Bayan Institute in Abadan, Khuzestan, Iran, were selected based on convenience sampling. Due to the inability to achieve random sampling, the participants were selected through convenience sampling and then randomly divided into the Static group (SG) and Control group (CG). Additionally, a pretest/posttest design was

employed to assess the treatment's impact, with classes conducted online via the Jitsi Meet platform during the autumn of 2021.

Participants

The study involved intermediate EFL learners from the Bayan Institute in Abadan, Khuzestan, Iran. Participants were selected based on convenience sampling, and their homogeneity was evaluated through the Oxford Placement Test (OPT) among 90 learners. Then, 60 learners whose scores were one standard deviation above and below the mean were selected as the participants of this study. The participants were randomly assigned to the SG and the CG, each consisting of 30 individuals aged 12 to 18 years, including both females and males. Their native languages were Persian and Arabic, and they were students of middle and secondary schools. Written informed consent was obtained from all participants before the beginning of the study. The consent form detailed the study's aims, procedures, potential benefits, and risks, and participants were informed of their right to withdraw from the study at any time without penalty. All data collected in this study were reported accurately and honestly.

Table 1.

Demographic Background of the Participants

Number of Students	60 EFL Learners
Gender	30 Females & 30 Males
Native Language	Persian and Arabic
Institute	Bayan, Abadan, Khuzestan, Iran
Academic Years	Autumn, 2021

Materials

Touchstone (MacCarthy et al., 2014) was utilized as the primary educational material for both groups. The book comprises three distinct levels: beginner, intermediate, and advanced. For this study, three chapters from the intermediate level were selected. The touchstone series' natural language, inductive learning, and personalization are key aspects. Touchstone presents natural language within real-life situations and focuses on developing conversational strategies, enabling learners to speak fluently and confidently. It is straightforward and enjoyable for teaching and provides a new perspective on English language instruction and acquisition. Whereas for CG, the textbook served as their sole information source, SG was introduced to the new language through infographics rather than a textbook.

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Instrumentation

In the context of this research, a variety of instruments were utilized. The first was the Oxford Placement Test (Allan, 2004), which was designed to evaluate the homogeneity of the participants. This test was administered via the Digi survey platform and comprised 100 multiple-choice items focused on vocabulary, grammar, and reading comprehension. The maximum achievable score for this assessment was 100. To support the homogeneity of the sample population, the reliability of the test was carefully assessed using the KR-21 formula, which yielded a reliability coefficient of 0.80.

The second instrument was a teacher-made multiple-choice test, administered as a pretest, which included 40 questions based on the course content and was administered via the Digi Survey website. Each question in the examination was assigned a value of one point, and the format utilized was multiple-choice. Participants were allotted approximately 50 minutes to complete the assessment. The primary objective of this examination was to ensure homogeneity among participants, thereby providing the necessary data to facilitate comparisons of the mean scores between the two groups on the pretest, posttest, and delayed posttest. The reliability of this test was computed through the KR-21 formula, which was 0.78. Two TEFL specialists at Islamic Azad University, Abadan, Iran, also approved the exam's validity in terms of content and face validity.

At the end of the treatment, a teacher-made multiple-choice test, serving as the posttest, was immediately administered through Digi Survey to two groups to assess their vocabulary gain. This posttest was developed as an equivalent version of the pretest, with modifications made to the stems and the order of the items to prevent any potential testing effects. The posttest maintained the same duration and number of items as the pretest, and each item was assigned a single point for scoring. Furthermore, the reliability of the posttest was determined through KR-21, resulting in a value of 0.80. Additionally, two TEFL experts from Islamic Azad University, Abadan, Iran, confirmed the validity of the test in terms of both face and content validity.

The delayed posttest was administered three weeks after the immediate posttest to assess how well the participants retained the vocabulary they had learned. It was administered online through the Digi Survey platform and was an equivalent version of the posttest in terms of content and format. The only difference was that the order of the questions was rearranged to minimize any further testing effects. The reliability of the delayed posttest, as measured by the KR-21 formula, was approximately 0.82. Two TEFL specialists from Islamic Azad University, Abadan, Iran, reviewed and confirmed the content and face validity of the pretest, posttest, and delayed posttest. The tests were administered to additional students who attended the same school and were enrolled in the same course to determine the dependability of the results; however, they were not given any treatments. The posttest and delayed posttest were designed as parallel forms, matching in content, structure, and difficulty. Both tests assessed the same learning

objectives with similar item formats. Statistical analysis confirmed their equivalence, with a high correlation between the two tests (r = 0.85) and comparable reliability coefficients (Cronbach's alpha: posttest = 0.80, delayed posttest = 0.82).

Another instrument was Piktochart, a web-based infographic application that allows users to create infographics easily. Piktochart can be used for websites, social media, blogs, and reports. It is a cloud-hosted graphic design that presents information in a high-quality and professional manner. It features numerous themes and templates, allowing users to customize the icons and graphics to suit their needs easily. One of the advantages of using Piktochart is its HTML publishing capability, which allows users to create various infographics with clickable buttons. Furthermore, users can add interactive maps, charts, videos, and hyperlinks. High-resolution final work can be downloaded in JPG, PDF, and PNG formats. Piktochart is suitable for beginners and professionals, and it is a user-friendly application.

The last instrument was Jitsi Meet, which connects users via the website or apps. The URL of the website is https://meet.jit.si/. Jitsi supports Windows and Unix systems as an application and mobile apps are available for both the App Store and Google Play. It is an open-source application used for audio and video conferencing. Jitsi Meet allows users to share their desktops during conferences, and invites can be sent to everyone through a simple custom URL. It is completely open-source, enabling any user to utilize it throughout the day without needing an account.

Procedure

The classes were conducted via Jitsi Meet, and each session lasted approximately 60 minutes. The research project consisted of 17 sessions, with the first and last sessions serving as pretest and posttest assessments. The initial session included a teacher-made test with 40 questions, all focused on the course topic. Before each session, the instructor prepared infographics that effectively presented 15 to 20 new vocabulary words. In all sessions, the SG received new vocabulary through infographics from the Touchstone book. For this purpose, well-structured static infographics were developed, effectively combining images and text to present the new vocabulary in a clear and engaging manner. Meanwhile, the CG received instruction on vocabulary acquisition without using infographics. The instructor employed a traditional approach, presenting new vocabulary by reading sample sentences from the textbook. This group engaged with the new words through various contexts, including sentences, texts, and passages.

At the end of the treatment, a teacher-made multiple-choice posttest was administered immediately to both groups to assess their vocabulary gain. Three weeks later, the groups were administered a delayed posttest to test their retention. The posttest and delayed posttest were equivalent versions of the pretest, with revised stems and item order to prevent the testing effect.

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Data Analysis Procedure

The collected data were analyzed using SPSS version 24. The Shapiro-Wilk test was initially used to check the normality of the data distribution. Then, descriptive statistics were calculated for SG pretest, posttest, and delayed posttest to address the first research question. To compare the significant changes experienced by the SG learners in this experiment, the SG's pretest, immediate posttest, and delayed posttest scores were compared using a one-way repeated measures ANOVA. ANCOVA was then employed to compare the difference in vocabulary knowledge between the SG and CG at the pretest, posttest, and delayed posttest phases. The researchers employed ANCOVA to control for the influence of pre-existing variables and group differences, thereby clarifying the posttest results.

Results

Evaluating the assumptions underlying one-way repeated-measures ANOVA was necessary before doing parametric statistics. The Shapiro-Wilk test of normalcy was used to verify one of these tests' most crucial underlying hypotheses, normality. A p-value of less than 0.05 in the test findings would suggest that the normality assumption was violated. In contrast, a p-value higher than the significance level would indicate that the normality assumption is true. The results of the Shapiro-Wilk test of normality performed on the SG and CG scores from the pretest, posttest, and delayed posttest are shown in Table 2:

Table 2.

The Results of the Normality Test

	Statistic	*df*	*p*-value
Static Group (SG)			
Pretest	.949	30	.162
Immediate posttest	.942	30	.133
Delayed posttest	.946	30	.145
Control Group (CG)			
Pretest	.931	30	.053
Immediate posttest	.946	30	.144
Delayed posttest	.953	30	.200

Table 2 shows that every p value in the right column of the table has a value greater than .05. It shows that the learners in two groups had normal distributions of scores for the pretest, immediate posttest, and delayed posttest; as a result, parametric tests like one-way repeated-measures ANOVA and ANCOVA could be performed.

This study examined whether static infographics significantly affected Iranian intermediate EFL learners' vocabulary gain and retention. The data were analyzed using

one-way repeated-measures ANOVA to determine if the SG experienced any significant changes during this research study. Table 3 presents the results of the descriptive statistics:

Table 3.

Descriptive Statistics for the SG

Tests	*N*	Mean	Std. Deviation	Skewness	Kurtosis
SG Pretest	30	8.45	2.04	-.002	-.43
SG Posttest	30	38.80	1.98	.26	-.33
SG Delayed Posttest	30	38.20	1.90	.32	-.38

According to Table 3, SG's mean score for the pretest was lower than the posttest mean score and the delayed posttest mean score. To check whether the differences between the three mean scores of the SG were statistically significant, the researcher needed to examine the *p*-value under the Sig. Column in the one-way repeated-measures ANOVA table, as depicted in Table 4.

Table 4.

One-way Repeated Measures ANOVA for the Scores of the SG

	Value	*F*	Hypothesis *df*	Error *df*	*Sig.*	Partial eta squared
Pillai's Trace	.97	14606.84	2.00	28.00	.00	.99
Wilks' Lambda	.003	14606.84	2.00	28.00	.00	.99
Hotelling's Trace	1043.44	14606.84	2.00	28.00	.00	.99
Roy's Largest Root	1044.45	14606.84	2.00	28.00	.00	.99

Table 4 shows that the *p*-value in front of Wilks' Lambda was less than the significance level of .05. It indicated a statistically significant difference between the mean scores of

the SG' scores on the vocabulary pretest, posttest, and delayed posttest. The post hoc test table (Table 5) needed to be reviewed to determine the exact location of the difference.

Table 5.

Post Hoc Test for the Scores of the SG

Time		Mean Difference	*Std.* Error	*Sig.*	95% Confidence Interval for Difference	
					Lower Bound	Upper Bound
Pretest	Posttest	-30.26*	.17	.00	-30.72	-29.81
	Delayed Posttest	-29.80*	.19	.00	-30.29	-29.30
Posttest	Pretest	30.26*	.17	.00	29.81	30.72
	Delayed Posttest	.46*	.13	.00	.12	.80
Delayed Posttest	Pretest	29.80*	.19	.00	29.30	30.29
	Posttest	-.46*	.13	.00	-.80	-.12

The difference between the pretest and posttest mean scores of the SG reached statistical significance since the *p*-value corresponding to this comparison was less than .05. Not surprisingly, the difference between the pretest and delayed posttest mean scores was also of statistical significance as the relevant *p*-value turned out to be less than the significance level ($p < .05$). Moreover, the difference between posttest and delayed posttest scores was statistically significant. Hence, it could be concluded that using static infographics could significantly improve the SG's vocabulary gain and retention. As shown in Table 3, the posttest mean scores of the SG were substantially higher than their pretest mean scores, but their delayed posttest mean scores were lower than the posttest mean scores and still higher than the pretest mean scores.

A one-way ANCOVA was utilized to compare the vocabulary gain and retention of the SG and CG on the pretest, posttest, and delayed posttest. The results of the analysis are presented in Tables 6 and 7.

Table 6.

Descriptive Statistics for the SG and CG's Knowledge of Vocabulary

	Groups	*N*	Mean	*Std.* Deviation	*Std.* Error Mean
Pretest	SG	30	8.45	2.06	.37
	CG	30	8.86	2.34	.42
Posttest	SG	30	38.80	1.96	.35
	CG	30	33.93	2.83	.51
Delayed Posttest	SG	30	38.20	1.92	.35
	CG	30	31.16	2.73	.49

As shown in Table 6, the difference in pretest scores between the SG and CG was not statistically significant. The posttest scores of the SG and CG were relatively different, and the delayed posttest scores of the SG and CG were also different. Since the study had two outcomes (gain and retention), two different ANCOVAs were employed;

For vocabulary gain, posttest scores are the dependent variable, the group is the independent variable, and pretest scores are the covariate. For retention, delayed posttest scores are the dependent variable, group is the independent variable, and pretest scores are the covariate. The ANCOVA test results are displayed below:

Table 7.

One-way ANCOVA for the Immediate Posttest Scores of the Learners

Source	Type III Sum of Squares	Df	Mean Square	F	SIG	Partial Eta Squared
Pretest	280.5	1	280.5	45.6	.000	0.61
Group	37.2	1	37.2	6.04	.019	0.17
Error	184.7	30	6.16			

The p-value across the row in the table above labeled "Groups" was found to be less than the defined significance level ($p < 0.05$) under the "Sig." column, showing at least a

statistically significant difference between the learners' scores on the immediate posttest in the two groups. The effect size under Partial Eta Squared was 0.17, indicating that the learners' immediate posttest scores varied by 17% as a result of being in separate groups. Therefore, the effect of the group is significant at posttest ($p=0.019 < 0.05$), suggesting that the type of instruction (static infographics vs textbook) had a statistically significant effect on vocabulary gain when controlling for pretest scores. Then, the delayed posttest results for these two groups were compared using a one-way analysis of covariance (ANCOVA). The ANCOVA test results are displayed below:

Table 8.

One-way ANCOVA for the Delayed Posttest Scores of the Learners

Source	SS	DF	MS	F	SIG (P)	Partial
Pretest	300.2	1	300.2	50.8	<.001	0.63
Group	48.6	1	48.6	8.22	.006	0.12
Error	343.1	58	5.92			

A one-way ANCOVA was conducted to examine the effect of instructional methods (static infographics vs traditional textbook-based instruction) on vocabulary retention, with pretest scores as the covariate. Table 8 shows that the impact of the group is also statistically significant ($F(1,58) = 8.22$, $p = .006$). This indicates that students in the static infographics group retained significantly more vocabulary than those in the textbook-based group after controlling for the initial vocabulary knowledge. Moreover, partial Eta Squared = 0.12, which suggests a medium effect size –meaning the use of static infographics had a meaningful impact on long-term retention. Therefore, there was a statistically significant difference between the two groups in delayed posttest performance after adjusting for pretest scores. It is worth noting that students who received vocabulary instruction through static infographics demonstrated significantly better vocabulary retention compared to those who were taught using traditional textbook methods.

Discussion

This study aimed to assess the role of static infographics in vocabulary gain and retention of intermediate Iranian EFL learners. The teacher taught the new vocabulary to the SG by using static infographics. As the results affirmed the success in the learning process, it can be concluded that static infographics significantly affected learners' vocabulary gain and retention among EFL learners. The results indicated a considerable difference between the three performances of the SG. The one-way repeated-measures *ANOVA* results showed a significant difference between the mean scores of the SG on the vocabulary pretest, posttest, and delayed posttest. Therefore, it could be concluded that using static infographics could significantly improve the SG's vocabulary gains and retention.

It can be stated that the current study contributed to previous research on the positive effect of static infographics on vocabulary gain and retention. Additionally, the results demonstrate that infographics greatly enhanced participants' learning outcomes. This result aligns with earlier studies that have acknowledged the value of infographics in various educational domains, helping students at different levels acquire more knowledge, retain information, and boost their confidence in the learning process (Chicca & Chunta, 2020; Nhan, 2023). Additionally, the result of this study agrees with William's (2002) finding that infographics present information to EFL learners through visual learning theory as the primary support system for cognitive process capability. Furthermore, they enable visual learners to gain knowledge via visual features.

Furthermore, these findings of the current study are consistent with those of Sadeghi and Farzizadeh (2013), who examined the effect of visual aids on vocabulary gains of beginner EFL learners. This experiment indicated a wealth of opportunities for instructors to experience the visual-support approach for teaching vocabulary. This also aligns with an earlier observation (Hegarty, 2004), which demonstrated that designing infographics enables learners to browse information considerably more effectively than simply reading a printed book. This finding agrees with Rezaei and Sayadians (2015), who suggested that utilizing infographics for teaching grammar increases EFL learners' comprehension and motivation. Moreover, infographics, as an innovative technique, lead to success in enhancing their grammatical knowledge. These findings complement the results of Afify (2018), who found that static infographics convey information concisely by utilizing photographs, images, forms, arrows, and graphics. Furthermore, its digital form is easily shared throughout social networking sites.

This finding further supports the idea of Kongwat and Sukavatee (2019). They found that infographics can help develop comprehension and encourage students to be more engaged in class. This result also aligns with other research (Alkhawaldeh & Khasawneh, 2020), which has demonstrated that using an infographic-based training program facilitates the learning of a second language and enhances participants' visual motor memory skills in the learning process. It also aligns with other observations (Alrwele, 2017), which showed that compared to the control group, the static group was able to memorize the information presented in infographics. Although these results are consistent with some published studies (Afify, 2018; Rezae & Shayadian, 2015; Sadeghi & Farzizadeh, 2013), they differ from other studies (Cifci, 2016; Lyra et al., 2016). They concluded there was no meaningful difference between using infographics and only text, as learners were passive in creating infographics.

There was also a considerable difference between the vocabulary pretest, posttest, and delayed posttest of the CG. It could be concluded that textbook-based teaching significantly improved CG's vocabulary knowledge. This study suggests that static infographics and textbook-based teaching significantly impacted the EFL learners' vocabulary gain and retention. It was revealed that using static infographics improved

EFL learners' gain and retention of vocabulary. It can be concluded that significant differences were observed between the posttest scores of the SG and CG and between their delayed posttests, in favor of the SG, indicating that using static infographics was more effective than textbook-based instruction in helping EFL learners' gain and retention of vocabulary.

This finding further supports the idea of Rezaei and Sayadian (2015), who studied the effects of infographics on Iranian EFL learners' grammar proficiency. Results showed that the static group exhibited superior performance compared to the control group on the posttests, and infographic instruction proved to be an effective tool for learning grammar. This finding corroborates Yildirim's (2016) suggestion that interactive and infographic materials with high visual features are preferred over traditional textbooks. It also aligns with other observations (Alrwele, 2017), which showed that compared to the control group, the static group was able to memorize the information presented in infographics. The present results also accord with earlier observations (Boers et al., 2017), which showed that using pictorial glosses led to improved EFL learners' vocabulary gain and retention. It is encouraging to compare this result with that of Fitriani et al. (2021), who found that EFL learners in the experimental group, instructed using infographics, outperformed the control group whose instruction was conventional.

Conclusion

This study began with the assumption that using static infographics could enhance learners' vocabulary gain and retention. At this time, the teacher used static infographics during the treatment for the SG, but the CG was taught vocabulary just through the textbook. After the posttest and delayed posttest, the results indicated that both static infographics and traditional instruction improved vocabulary gain and retention; however, the performance of the SG was better than that of the CG. The conclusions that could be made are: (a) using static infographics could be highly emphasized when learning vocabulary is the focus of the study, and (b) although the textbook-based teaching was less significant than using static infographics in this study, it could also be utilized as the second priority in teaching vocabulary in the EFL class. The findings indicate that the use of static infographics had a significantly positive effect on both vocabulary gain and retention among Iranian intermediate EFL learners compared to traditional textbook-based instruction. Namely, the group exposed to static infographics outperformed the control group on the immediate posttest after controlling for pretest scores, suggesting that visual representation of vocabulary enhances the initial acquisition of new words. More importantly, the static infographics group also showed significant improvement in performance on the delayed posttest, indicating stronger long-term vocabulary retention. This implies that combining visual and textual input facilitates deeper cognitive processing and memory encoding. These results support the integration

of visual aids, particularly static infographics, into EFL vocabulary instruction as an effective alternative or supplement to traditional teaching methods.

Based on the research findings, this study suggests the following implications and recommendations for EFL learners, teachers, and material developers to support them in the EFL setting. The results are helpful for language teachers because this type of study leads to more effective teaching methodologies and better criteria for selecting materials. This research is beneficial for EFL learners, as infographics are motivating and visually appealing to most students. This study also has implications for material developers and compilers of instructional materials. Material designers should incorporate infographics into the class by drawing insights from the present study. The findings of this study suggest that static infographics can be an effective way to teach EFL vocabulary.

Considering that the infographics are innovative, further studies should be conducted to explore whether teachers, especially those with less experience, encounter difficulties in designing and using infographics. As this study was conducted with participants at the intermediate level, succeeding studies can be repeated for advanced and elementary language learners. The researchers faced some limitations during this study (a) the context was affected by the COVID-19 pandemic, and it was transferred online; (b) the time allocated to the instructions was very limited, and (c) the roles of other variables; such as gender, motivation, and anxiety were not included in this research.

Bio-data

First Author: collected data, designed, conducted the procedure, and wrote the first draft.

Second Author: read, made necessary revisions, and approved the final manuscript.

Third Author: read, made necessary revisions, and approved the final manuscript.

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Appendix

1. https://create.piktochart.com/output/51798764-my-visual

2. https://create.piktochart.com/output/51817458-english-tavana