

The Impact of Infographics on EFL Adolescent Learners' Vocabulary Retention

Lam Ky Nhan¹

¹Master, Nam Can Tho University, Vietnam

Abstract– Because of the rapid advancement of technology, multimedia is now being used in English classrooms to help students enhance their language skills. The current study intended to investigate the impact of Infographics on vocabulary retention in EFL adolescent learners. A pretest was given to both groups at the start of the treatment period, and the participants subsequently attended 6 sessions. During these sessions, the experimental group (EG) was taught using Infographics, whereas the control group (CG) was taught using traditional methods. The posttest and delayed posttest were used to assess the student's vocabulary acquisition and retention. The results showed that the EG greatly outperformed the CG in the posttest and delayed posttest. As a result, the Infographics showed to be more successful in helping these learners acquire English vocabulary. The findings may have ramifications for instructors since they improve their grasp of using technology in general, and Infographics in particular, and lead to more successful teaching methods.

Keywords — Infographics, vocabulary retention, visualizations

I. INTRODUCTION

Today's EFL teachers must change their techniques to keep up with ever changing technologies. According to Gilakjani and Sodouri (2017), technology has modified the traditional approaches in traditional classrooms. Multimedia has attracted special attention among these technologies. Multimedia is defined as the incorporation of text, graphics, drawing, music, animation, and interactive material (Brett, 1998; Mayer, 2005). In other terms, multimedia is the display of information in several formats. As a result, one of the research' key goals was to assist language acquisition with multimedia content, and the purpose of this study was to examine one of them, animated infographics.

Some teachers have difficulty teaching learners a new language (e.g., Ghonsooly et al., 2012; Malmir & Parhizkari, 2021; Shabani et al., 2018; Taghizadeh & Zafarpour, 2022). Learning vocabulary is one of the most difficult challenges for certain students, and the process by which students acquire new vocabulary has lately garnered attention (Surmanov & Azimova, 2020). It goes without saying that teaching vocabulary in EFL lessons using traditional approaches is tiresome and exhausting. According to Coniam and Wong (2004), technology creates a non-threatening atmosphere. As a result, it reduces the emotional filter for learning, allowing personal interest and relevant elements to engage students in meaningful language use (Coniam & Wong, 2004). Furthermore, Gencler (2015) argues that technology improves student motivation by providing timely and relevant information. Furthermore, Ahmadi (2018) stated that incorporating technology into the classroom increased chances for engagement while also promoting learners' autonomy and motivation. Although some conventional teachers used statistic posters to exhibit and deliver new knowledge, multimedia such as animated infographics might be more effective in educational settings (Bicen & Beheshti, 2017). Nowadays, multimedia may be useful in a variety of ways. They may be used to improve lesson preparation and other areas of the teaching and learning environment in the arts, science classes, universities, and colleges.

A small number of research have been conducted throughout the years to explore the usefulness of infographics in facilitating language acquisition. The purpose of this article is to look at the impact of infographics training on EFL students. Although the favorable impact of infographics on knowledge is undeniable, "there is a lack of research to examine what learner and instructional variables can infographics influence student learning, especially in academic settings" (Lim & Morris, 2009, p. 283).

This study sought to analyze the effect of infographic on EFL learner vocabulary retention. The following research question was posed: —To what extent does the use of Infographic-based learning affect students' vocabulary retention?

II. LITERATURE REVIEW

2.1 Vocabulary

2.1.1 Definitions

Students may need to understand not only the structure of English, but also the vocabulary. Vocabulary cannot be given correctly without grammar in communication. To communicate successfully, students must understand both vocabulary and grammar.

According to Zahedi and Abdi (2012), one of the most significant aspects of language use is vocabulary. According to Ihbar and Said (2018), vocabulary acquisition occurs when a person receives a new vocabulary and synthesizes it with basic information. Furthermore, Krishnan and Yunus (2018) said that learning a second language necessitates vocabulary knowledge. Because a restricted second-language vocabulary is a barrier to communication, second-language learners must develop vocabulary. Vocabulary learning is critical for second language proficiency since mastery of primary language abilities such as listening, speaking, reading, and writing is strongly dependent on word knowledge (Hao et al., 2021). Acquiring vocabulary in another language appears difficult because memorizing a term without exercising it in context is not the end aim of deep vocabulary acquisition. Nation (2001) said that knowing a word entails more than just acquiring its meaning; comprehending a word necessitates learners grasping its form, meaning, and application; hence, each criteria incorporates a receptive/productive dichotomy. The first criterion focuses on knowing the target word's form, which comprises its spoken, written, and word elements.

As teachers became more aware of the importance of vocabulary in language acquisition, they paid more attention to vocabulary instruction (Hunt & Begla, 2005). According to Folse (2004), developing vocabulary is vital for learning a foreign/second language. Furthermore, Hunt and Beglar (2005) emphasize the importance of vocabulary in language understanding and production. It is also worth noting that vocabulary should not be overlooked due to its relevance in learning a new language (Hoshino, 2010).

2.1.2 Kinds of Vocabulary

As referenced in Fauzan Azima's magazine, below are the sorts of vocabulary in teaching English as a foreign language in particular references in nation vocabulary separated such a term.

- a) *Receptive Vocabulary*: Knowing a word means being able to recognize it whether it is heard (How does it sound?) or seen (How does it look?) and knowing what grammatical structure the word would follow. This entails separating it from words with similar forms and deciding whether the word form sounds or seems correct.
- b) *Productive Vocabulary*: Knowing a word entails knowing how to pronounce it, how to write and spell it, how to use it in grammatical pattern along with the word that usually collocates with it, not using the word too frequently if it is typically a low frequency word, and using the word in a suitable situation using the word to stand for the meaning it represents, and being able to think of suitable substitutes for the word if there are any.

According to the description above, each expert in each book classifies distinct types of language since each individual has their own unique manner of expressing and communicating their beliefs and ideas. It indicates that there are two types of words in vocabulary: function words and content words.

Vocabulary is essential if students are to appreciate their lessons. People with broader vocabularies will have less problems than those with lower vocabularies. They will swiftly get information from a certain book since they understand every word in the text. Those who do not speak English, on the other hand, will face a number of challenges. Mastering vocabulary will help you achieve your language-teaching objectives. That is linguistic mastery (the ability to listen, speak, read, and write). If we want to communicate with individuals in a certain language, we must first understand the language to which they belong, particularly in terms of vocabulary.

2.2 Infographics

2.2.1 Definitions

The word “infographic” consists of the words “info” and “graphic” and it is shortened from the expression “information graphic”. In general, the infographic is visual presentations of data, information, and knowledge.

An infographic is a visual representation of information that combines text and pictures such as drawings and charts with the use of color and white space. This graphic illustration of idea and data may assist the viewer in more easily grasping knowledge (Janalta Interactive Inc, 2014). Although infographics are not new, they have become more common in educational settings in recent years to deliver information, link numerical data, show significant concepts, and enhance visual literacy abilities in learners (Krauss, 2012).

Infographics are one of the most often utilized visual literacy medium. According to Ferreira (2014), an infographic or information graphic is a sort of visual that elaborates facts with design to assist individuals and organizations in communicating messages to their target audience in a clear manner. According to Mohd Noh et al. (2014), higher learning institutions should incorporate infographics into the learning process.

2.2.2 The purposes of Infographics-based learning

Infographics may be used for a variety of educational reasons. Because infographics can present comprehensive information, they can be used for a variety of purposes, including demonstrating the relationship between different concepts, transferring processes and events, presenting course content, and summarizing the subjects learned (Meeusah and Tangkijviwat, 2013).

Because of these outstanding feature, infographic may be a promising technique for instruction and could serve a variety of purpose. Lamb and Johnson (2014) proposed five uses for infographics:

- a. organizing ideas and coherent manners in a useful way
- b. illustrating biographical, scientific, art and design, historical, and social studies concepts in a visual way
- c. comparing information in an effective way
- d. making data meaningful by providing analogies, examples, and themes; plain data can be transformed into meaningful information
- e. telling a story to convey the idea with visual and word in an exciting way rather than using only words

When the persistence of visual materials on the student is examined, a well-prepared infographic is likely to make a difference and to gain importance in the field of education (Borucu, 2015). There are several advantages of infographics in education such as reminding of existing information in normal or distance education, transferring processes and events, presentation of course content, summarizing learned information, showing relationships between concepts (Meeusah & Tangkijviwat, 2013). Another point is that infographics can help a person to 26 remember more than 70% of the data that they have been seen, averagely (Gaille, 2016).

2.2.3 Types of Infographics-based learning

Many researchers claim that painted depictions of animals and hunting scenes are not just decorations or religious symbols, but also function as a form of communication between individuals. As a medium for information dissemination, Infographics serve this purpose. According to Afify (2018) and Hassan (2016), Infographics may be classified into the following categories:

- **Static Infographic:** Static Infographics are static or immovable visuals that convey information via images. Alternatively, non-interactive Infographics are referred to as such as posters, newspapers, ads, etc., are examples of graphically created information for printing. Infographics without moving pictures are also used on websites and social media.
- **Animated Infographic:** As the name suggests, this category relates to static pictures that have been animated for display on screens such as televisions, YouTube and Vimeo, information kiosks, etc. It is common for animated Infographics to include comparable information to immovable visuals and to be able to present data in real-time. A variety of computer software, including Adobe After Effects and Powtoon, are used to create this animated information.

- **Interactive Infographic:** Interactivity is provided in this Infographic by the use of buttons and menus that may be clicked on to show information. Users may pick and obtain information according to their preferences, which is a benefit over static and animated information. Additionally, it provides for a thorough presentation of the information. Various applications and media of information transmission utilize infographics.

2.2.4 Advantages of Using Infographic

Nowadays, individuals utilize infographics for a variety of objectives, including mass media, commerce, and education. In advertising, for example, an infographic is typically used to create a poster that contains a large amount of information on a single piece of paper. Another application of infographics is in the field of education. Infographics are used in education to assist teachers in communicating topic content to students. Some teachers regard infographics as a possible visual media for use in the classroom.

There are numerous infographics for education purposes, particularly for learning English, that can be easily accessed on the internet. The infographic can be used by English teachers to teach grammar, writing, vocabulary, and other English skills.

III.METHODOLOGY

3.1 Research design

The current study was constructed as an experiment using a two-group pre-test and post-test design. An experimental study, according to Gay and Airasian (2000), is designed to investigate the impact and efficacy of a therapy. The usage of Infographics in learning Vocabulary classes (the independent variable) was tracked in an experimental study, and students' retention in learning (the dependent variable) was examined. In order to measure whether a treatment has had an effect or whether one treatment is more effective than another, Cohen, Marion, and Morrison (2000), Fraenkel and Wallen (2000) argue that an experimental study should be carried out with two groups of participants: an experimental group who receives the treatment and a control group who does not receive the treatment. The control group is crucially important for it enables the researcher to compare the outcomes of the two groups.

3.2 Participants

A total of 78 teenage learners from a high school in Soc Trang city participated in the current study, comprising 33 (43%) males and 45 (57%) females. The majority of them were students aged 15 to 16 from a high school in Soc Trang. Their knowledge was assumed to be at the pre-intermediate level based on the previous school year's final scores. These students had studied English for at least seven years.

The participants were conveniently assigned into two groups, so the researcher randomly took one for the control group and the other, the experimental one. They were required to complete a pre-test, a post-test and a delay post-test in the study process.

Table I:
DEMOGRAPHIC BACKGROUND OF THE PARTICIPANTS

No. of Students	78 EFL Students
Gender	33 Females & 45 Males
Native language	Vietnamese
School	A high school at Mekong Delta
Academic Years	Autumn, 2023
Years of study	7 years

3.3 Research instruments

Both groups received a vocabulary-based pretest prior to therapy. As the pretest, a teacher-created test measuring the learners' vocabulary knowledge was offered before to the therapy. The test consisted of 40 multiple-choice questions, each with a score of one. Two professionals in the field of SLA validated the test's content and face validity.



After the treatments, the participants were given a post-test based on the knowledge they had been taught during the treatment sessions to assess their progress throughout the course. The posttest consisted of 40 multiple-choice items, each with a score of nought point twenty-five. Each exam was given around an hour of time. Four weeks following the posttest, the identical test was repeated to the two groups as a delayed posttest to assess retention. The sole variation between the posttest and the delayed posttest was the sequence of the items to avoid the testing effect.

Vocabulary tests: The first measure consisted of two vocabulary exams that served as the pretest, immediate post-test, and delayed post-test. The researcher designed tests that solely addressed two components of language knowledge. The first was used to assess form-meaning link knowledge, while the second was intended to assess grammatical function knowledge.

IV. FINDINGS

This section presents the findings of the study regard to students' Vocabulary performance before and after the intervention. Three Vocabulary tests selected from achievement tests for students were used to measure participants' achievement in Vocabulary in English. Three tests were nearly identical in terms of structure and difficulty. Scoring for each is ranked from zero as the minimum to ten as the maximum. Scores were transferred to SPSS 24.0 for data analysis.

4.1 Participants' Vocabulary retention within the two groups before and after the intervention.

In order to identify students' changes in vocabulary retention, the General Linear Model test was carried out. Initially, the result of control group's pre-test and post-test were collected and analyzed. With $p=0.00$, it is confident enough to conclude that the pre-test's mean score and the post-test's mean score are different. Then, the Descriptive Statistic Test was performed to identify mean score of each test.

Table II
Mean difference of students' vocabulary performance within control group

Group	Tests	N	Min.	Max.	Mean	SD
Control	Pre-test	39	1.00	7.50	5.49	1.84
	Post-test	39	3.50	8.50	6.73	1.75
	Delayed post-test	39	3.00	8.00	6.53	1.12

As can be seen from Table II, participants' vocabulary performance in the control group changed following the research. The means differed in the pre-test, post-test, and delayed post-test ($M_{pre}=5.49$; $SD=1.84$, $M_{post}=6.73$; $SD=1.75$, $M_{delay}=6.53$; 1.12) ($F=52.82$, $df=1$, $p=0.00$). The post-test mean score was greater than the pre-test mean score. Although the delayed post-test mean ($M=6.53$; $SD=1.12$) was lower than the post-test mean, it was higher than the pre-test mean. It can be inferred that students' vocabulary retention in the control group improved after eight weeks of intervention.

Afterward, the General Linear Model test was carried out to identify the difference of mean score of experimental group's pretest, posttest and delayed Posttest ($p=0.00$) led to a conclusion that it was fully confident that the vocabulary retention of the experimental group was different at pretest, posttest and delayed posttest. Later, the mean scores of the pre-test, post-test and delayed post-test were clarified by Descriptive Statistic Test

Table III
Mean difference of students' vocabulary performance within experimental group

Group	Tests	N	Min.	Max.	Mean	SD
Experimental	Pre-test	39	2.50	8.50	4.93	1.43
	Post-test	39	5.50	9.50	7.78	1.08
	Delayed post-test	39	5.00	9.00	7.53	1.20

The pretest's mean score differed from the posttest's mean score. ($F=181.35$, $Df=1$, $p=0.00$) ($M_{pre}=4.93$, $SD=1.43$, $M_{post}=7.78$, $SD=1.08$) ($F=181.35$, $Df=1$, $p=0.00$). The result shows that the post-test mean was greater than the pre-test mean. Furthermore, the delayed post-test mean ($M=7.53$; $SD=1.20$) was lower than the post-test mean but still higher than the pre-test mean. Following the trial, the experimental group's vocabulary retention improved noticeably.

4.2 Participants' vocabulary retention between the two groups before and after the intervention

The Descriptive Statistic Test, the Independent Sample T Test, and the General Linear Model test were used to compare students' vocabulary retention between the two groups before and after the intervention. First, the Descriptive Statistic Test results are shown in the table below.

Table IV
Students' vocabulary retention between the two groups

Tests	Conditions	N	Min.	Max.	Mean	SD
Pre-test	Control	39	1.00	7.50	5.49	1.84
	Experiment	39	2.50	8.50	4.93	1.43
Post-test	Control	39	3.50	8.50	6.73	1.75
	Experiment	39	5.50	9.50	7.78	1.08
Delayed post-test	Control	39	3.00	8.00	6.53	1.12
	Experiment	39	5.00	9.00	7.53	1.20

4.2.1 Students' vocabulary retention between the two groups before the intervention

In the pre-test, the control group's mean score ($M=5.49$) was somewhat higher than the experimental group's mean score ($M=4.93$). An Independent Sample T Test was used to determine whether there was a significant difference in the students' vocabulary retention in the pre-test between the control and experimental groups. The difference in students' vocabulary retention between the two groups in the pre-test was not significant ($t = -.019$, $df=72$, $p=.98$). This suggests that students in both groups retained the same vocabulary during the pretest. Before the intervention, the two groups were evenly dispersed.

4.2.2 Students' vocabulary retention between the two groups after the intervention

Table IV further demonstrated that the students' vocabulary retention differed between the two groups following the intervention. After eight weeks of intervention, both groups' post-test averages had significantly improved ($M_{post}=6.73$ for the control group, experimental $M_{post}=7.78$ for the experimental group). Furthermore, there were relative declines in both groups' delayed posttest averages (four weeks after intervention) (control $M_{post}=6.53$, experimental $M_{post}=7.53$).

In conclusion, after twelve weeks, there was an improvement in vocabulary retention between the control and experimental groups' pretest/posttest and pretest/delayed posttest. The results revealed that there was significant difference in vocabulary retention between the two groups following the intervention. This fact leads to the conclusion that students who use Infographics in their learning were able to retain terminology over time.

V. DISCUSSION

The findings are addressed in this section based on the theoretical framework that drove the current effort and earlier study results that investigated the domain of technology and L2 vocabulary acquisition. The immediate post-test findings show a significant difference in the scores of the groups in favor of the experimental groups. Furthermore, the findings of the oral interview show that the experimental group students outperformed the control group students significantly. As a result, using infographics increases participants' L2 vocabulary learning.

This conclusion is consistent with the findings of numerous studies in the literature that emphasize the usefulness of infographics in the field of learning and teaching (Bicen and Beheshti, 2017; Islamoglu et al., 2015; Ozdamli et al., 2016). The findings also show that infographics significantly improved participants' learning achievement. Furthermore, this finding is consistent with previous research recognizing the effectiveness of infographics in various educational fields to help students at various stages acquire additional learning, gain memorable knowledge, and increase their trust in the educational process (Chicca and Chunta, 2020; Baglama et al., 2017; Hassan, 2016; Ozdamli et al., 2016). Furthermore, the current findings are consistent with previous research on the impact of infographics on overall EFL learning (e.g., Alrwele, 2017; Bicen and Beheshti, 2019; Hameed and Jabeen, 2022; Pisarenko and Bondarev, 2016).

V. CONCLUSION

This study examines the impact of infographics on vocabulary learning and retention, as well as participants' attitudes regarding infographics. According to the findings, infographics are effective in enhancing learners' L2 vocabulary. Furthermore, graphical education motivates learners to improve their vocabulary knowledge by providing opportunities for them to be more effective in their recognition and production of vocabulary learning. Furthermore, the participants have extremely good attitudes on learning through infographics. Further research and experimentation on the use of infographics in L2 learning could be beneficial in confirming these findings and determining additional uses of using infographics in increasing various parts of vocabulary knowledge. As a result, the advantage of teaching L2 vocabulary through an infographic technique is worth investigating.

About the Authors

Lam Ky Nhan earned his M.A in English Education from Can Tho University in 2021. He is a lecturer of general English and English for specific purposes at Nam Can Tho University, Vietnam, currently pursuing his Ph.D's, with anticipated graduation in 2026. His teaching interests include teaching grammar and academic writing, teacher and learner motivation, testing and assessment.

References

- [1] Afify, M. K. (2018). The effect of the difference between infographic designing types (static vs animated) on developing visual learning designing skills and recognition of its elements and principles. *IJET*, 13(No.9), 204–223.
- [2] Ahmadi, M. R. (2018). The use of technology in English language learning: A literature review. *International Journal of Research in English Education (IJREE)*, 3(2), 115-125.
- [3] Alrwele S (2017) Effects of infographics on student achievement and students' perceptions of the impacts of infographics. *J Educ Hum Dev* 6(3):104–117
- [4] Baglama B, Yucesoy Y, Uzunboylu H, Özcan D (2017) Can infographics facilitating the learning of individuals with mathematical learning difficulties?. *Int J Cogn Res Sci Eng Educ* 5(2):119–128
- [5] Bicen, H., & Beheshti, M. (2017). The psychological impact of infographics in education. *Broad Research in Artificial Intelligence and Neuroscience*, 8(4), 99–108. <https://www.edusoft.ro/brain/index.php/brain/article/view/733/821>
- [6] Bicen, H., & Beheshti, M. (2019). The psychological impact of infographics in education. *Broad Research in Artificial Intelligence and Neuroscience*, 8(4), 99-1-8.
- [7] Borucu, A. (2015). Güzel Sanatlar Liselerinde Grafik Dersinin İşlenişinde İnfografik'in, Öğrenme Yöntemine Katkısı. Süleyman Demirel Üniversitesi. *Yüksek Lisans Tezi*, Süleyman Demirel Üniversitesi, Isparta.
- [8] Brett, P. (1998). Using multimedia: A descriptive investigation of incidental language learning. *Computer Assisted Language Learning*, 11 (2), 179-200.
- [9] Chicca J, Chunta K (2020) Engaging students with visual stories: using infographics in nursing education. *Teach Learn Nurs* 15(1):32–36
- [10] Coniam, D., & Wong, R. (2004). Internet relay chat as a tool in the autonomous development of ESL learners' English language ability: An exploratory study. *System*, 32(3), 321-335.
- [11] Fauzan, Azima. Fauzan Azima, *Teaching Vocabulary Through Verbal Techniques*, Sumatera, Bung Hatta University
- [12] Folse, K. (2004). *Vocabulary myths*. Ann Arbor.



- [13] Fraenkel, J. F., Wallen, N. E., & Hyun, H. H. (2012). *How to design and evaluate research in education* (8th ed). New York, United States of America: McGraw-Hill
- [14] Fraenkel, J. R. & Wallen, N. E. (2000). *How to design and evaluate research in education*. (4th ed.). MacGrwa-Hill.
- [15] Gaille, B. (2016). *18 Pros and Cons of Infographics*. Retrieved from <https://brandongaille.com/18-pros-and-cons-of-infographics/>
- [16] Gay, L. R, Mills, G. E. & Airasian, P. W. (2011). *Educational research: Competencies for analysis and applications*. (10th ed). USA: Pearson Education, International.
- [17] Gay, L.G. & Airasian, P. (2000). *Educational research: Competencies for Analysis and Application*. New Jersey: Prentice Hall, Inc.
- [18] Gencler, B. (2015). How does technology affect the language learning process at an early age?. *Proceda-Social and Behavioral Sciences*, 19(9), 311-316.
- [19] Ghonsooly, B., Khajavy, G. H., & Asadpour, F. (2012). Willingness to communicate in English among Iranian non-English major university students. *Journal of Language and Social Psychology*, 31, 197-212.
- [20] Gilakjani, A. P., & Sabouri, N. B. (2017). Advantages of using a computer in teaching English pronunciation. *International Journal of Research in English Education(IJREE)*, 2(3), 78-85.
- [21] Hameed A, Jabeen I (2022) Prompting cognition for creativity in EFL context: an experimental study on use of infographics for teaching writing skill. *J Lan- guage Linguist Stud* 18(1):724–737
- [22] Hao T, Wang Z, Ardashaeva Y (2021) Technology-assisted vocabulary learning for EFL learners: a meta-analysis. *J Res Educ Eff* 14(3):645–667
- [23] Hassan HG (2016) Designing infographics to support teaching complex science subject: a comparison between static and animated Infographics. MA Thesis, Iowa State University, ProQuest Dissertations and Theses
- [24] Hoshino, Y. (2010). The categorical facilitation effects on L2 vocabulary learning in a classroom setting. *RELC Journal*, 41, 301–312.
- [25] Hunt, A., & Beglar, D. (2005). A framework for developing EFL reading vocabulary. *Reading in a Foreign Language*, 17 (1), 23-59.
- [26] Hunt, A., & Beglar, D. (2005). A framework for developing EFL reading vocabulary. *Reading in a Foreign Language*, 17 (1), 23-59.
- [27] Ihbar, M. Z., & Said, N. E. M. (2018). The effects of blended learning on EFL high school student's vocabulary mastery. *International Journal of Innovative Research and Creative Technology*, 4(6), 111-116.
- [28] Islamoglu H, Ay O, Ilic U, Mercimek B, Donmez P, Kuzu A, Odabasi F (2015) Infographics: a new competency area for teacher candidates. *Cypriot J Educ Sci* 10(1):32–39
- [29] Janalta Interactive Inc. (2014). *Information graphic (infographic)*. Retrieved from <http://www.techopedia.com/definition/27808/information-graphic-infographic>
- [30] Krauss, J. (2012). More than words can say: *Infographics. Learning and Leading with Technology*, 39(5), 10-14.
- [31] Krishnan, P. D., & Yunus, M. M. (2018). Animated cartoons to develop listening skills and vocabulary. *International Journal of Engineering & Technology*, 7 (4), 20-25.
- [32] Lamb, A., & Johnson, L. (2014). Infographics part 1: Invitations to Inquiry. *Teacher Librarian*, 41(4), 54-58, 63.
- [33] Meeusah, N., & Tangkijviwat, U. (2013). Effect of data set and hue on a content understanding of infographic. *ACA2013 Thanyaburi: Blooming Color for Life*, December 11-13, 2013, 272-275.
- [34] Nation ISP (2001) Learning vocabulary in another language. *Cambridge University Press*
- [35] Ozdamli F, Kocakoyun S, Sahin T, Akdag S (2016) Statistical reasoning of impact of infographics on education. *Procedia Comput Sci* 102:370–377
- [36] Pisarenko V, Bondarev M (2016) Infographics use in teaching foreign languages for specific purposes. *Recent Patents Comput Sci* 9(2):124–132
- [37] Surmanov, S., & Azimova, M. (2020). Analysis of difficulties in vocabulary acquisition. *Journal of Legal Studies and Research*, 6(1), 144-153.
- [38] Zahedi, Y., & Abdi, M. (2012). The effect of semantic mapping strategy on EFL learners' vocabulary learning. *Social and Behavioral Sciences*, 69, 2273-2280.