

Reflective practice

Autonomy in Vocabulary Learning of Turkish EFL Learners

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Abstract

The primary aim of this study is to investigate the impact of a mobile flashcards application, Quizlet, on students' performance and autonomy in vocabulary learning. The study also attempts to explore the perceptions of students and their teacher about incorporating this application into the teaching, learning and practicing of target vocabulary in English language preparatory classes. To achieve these objectives, a nonrandomized quasi-experimental research design was adopted. The participants were selected from two intact classes of Turkish EFL students enrolled in a language preparatory program at a foundation (non-profit, private) university in Istanbul, Turkey. The data was collected through pre- and post- vocabulary tests, an online survey, student interviews and a teacher's reflective journal. The findings revealed that Quizlet had a positive impact on students' performance and their autonomy in vocabulary learning. The overall perceptions of participating students and their teacher about using Quizlet to teach and learn English vocabulary were also positive. Based on these findings, the study provides practical implications and offers suggestions for integrating mobile learning into English language preparatory classes.

Keywords: Mobile-assisted language learning, vocabulary performance, autonomy, mobile application.

1. Introduction

The increasing use of technological devices has enabled English language teachers to apply different teaching methods and strategies in their classroom. This rapid improvement in technology has given teachers the opportunity to incorporate mobile devices into their teaching practices and help their students to become more motivated and eager to learn. Specifically, the use of mobile tools has enabled educators to shift from traditional teaching methods and strategies to mobile-based learning which results in better vocabulary gains, more effective reading comprehension and increased language achievement (Kieffer & Lesaux, 2012; Nagy & Scott, 2001; Nation, 2001). Recent research has examined the effects and benefits of mobile-assisted language learning (MALL) by making use of its inherent features as 'spontaneous, personal, informal, portable and ubiquitous' (Kukulka-Hulme, 2006). The findings reveal that smartphones in particular are effective instructional tools to meet the language needs of students as well as attract their interests (Martin & Ertzberger, 2013; Sandberg, Maris & Geus, 2011; Tayebnik & Puteh, 2012). Since we live in this technologically advanced era, traditional classroom tools have been replaced by technology-based materials, and therefore, more and more students have been using the internet on their laptops, tablets or smartphones to study in and out of class. By using these technological devices, it is easy both for students and teachers to reach the information and learning materials whenever or wherever needed. Therefore, it is important to raise the awareness of educators about the effectiveness of mobile applications and how they can

be utilized in language classrooms to provide a fun means of enhancing students' learning, increasing their motivation and helping them become autonomous learners.

2. Literature review

The increasing use of mobile devices has given rise to the development of a number of applications to facilitate the process of teaching and learning in English classrooms. Innovations in technology provide teachers and students with opportunities to enhance, in particular, the process of vocabulary acquisition. It is a widely accepted fact that mobile devices are effective and efficient tools with a lot of pedagogical potential in terms of language learning and mastering language skills (Burston, 2013).

MALL is considered and proved to be more effective in fostering vocabulary learning through various types of exercises based on multimedia learning than paper based learning and teaching strategies and tools (Altiner, 2011; Alavinia & Qoitassi, 2013; Azabdaftari & Mozaheb, 2012; Chu, 2011; Godwin-Jones, 2011; McLean, Hogg, & Rush, 2013; Motallebzadeh & Ganjali, 2011). The findings report that vocabulary learning through the use of an application on a mobile device is more effective than learning through traditional methods and strategies.

Moreover, the majority of the studies which have been recently conducted on vocabulary acquisition, explored not only the role of mobile devices and applications, but also online flashcard programs and websites in vocabulary acquisition (Al-Jarf, 2007; Kilickaya & Krajka, 2010; Stockwell, 2010; Thornton & Houser, 2005). To begin with, McLean et al. (2013) aimed to explore the effectiveness of the online flashcard site Word Engine as a supplementary tool for vocabulary learning among Japanese university students. The results revealed that the website enhanced the students' vocabulary performance. The students who studied vocabulary by using this flashcard website outscored those who used extensive reading to study the vocabulary items on the vocabulary post-test, which is clear evidence that utilizing an online flashcard website is a more efficient way to study and acquire vocabulary. Likewise, in a comparative study conducted by Basoglu and Akdemir (2010), the effectiveness of using a digital flashcard program, ECTACO (simple mobile flashcards application), was investigated in comparison to paper-based vocabulary flashcards. The participants of the study were 60 Turkish students studying in the English Preparatory Program at a public university and they were required to study 1000 target words over the course of six weeks. The findings showed that both the participants in the experimental group who used the mobile application and those in the control group who studied vocabulary using paper-based flashcards improved their vocabulary knowledge. However, the students in the treatment group had significantly better results than their control group counterparts, and those who studied using the application reported that this tool was a motivating tool. In a similar study on MALL, Azabdaftari and Mozaheb (2012) investigated the effectiveness of mobile-based flashcards in the vocabulary learning performance of Iranian university students. The interviews showed that the convenience of the flashcards and the entertainment factor of using the application motivated the students more to study vocabulary on their mobile devices in and out of the class.

Furthermore, the use of mobile devices which can connect to the internet in education has increased at a rapid rate since the iPad was first introduced in 2010. Empirical findings also revealed that applications specifically developed to run on these devices promote student progress regarding speaking, reading, and writing skills (Harmon, 2012; Lys, 2013; McClanahan, Williams, Kennedy, & Tate, 2012) and these applications enhance the learning motivation (Kinash, Brand, & Mathew, 2012). Recent research also suggests that mobile-assisted language learning provides language learners with the required amount of exposure to acquire target structures and vocabulary items (Thornton & Houser, 2005; Clark, 2013; Wang et al., 2015). For instance, an experimental study carried out by Clark (2013) with five English language learners at the first grade sought to explore the effectiveness of using an iPad application (Vocabulary Builder) on the vocabulary learning of elementary level learners of English. The study lasted for 12 sessions in total, one 30-minute session daily, and the control group in this study studied a vocabulary worksheet prepared by the teacher to learn and revise the target vocabulary structures whereas the students in the experimental group did the exercises on the iPad application. The results revealed that the iPad application

enhanced the vocabulary acquisition of the students in the experimental group. The application provided these students with additional exposure to vocabulary items as they were able to study with the flashcards (visual exposure) and listen to the pronunciation of the words (auditory stimulation) by using the application. The students in the experimental group who used the iPad application reported that they were more engaged in the exercises and activities and more motivated to learn the vocabulary.

In a similar fashion, Wang et al. (2015) examined the efficiency of iPad applications on vocabulary learning and engagement of English learners at the university level. The researchers conducted an experimental study with two freshman English classes (N=74) at a private university in Taiwan. The experimental group learned the vocabulary items via the Learn British English WordPower application and the students in the control group studied vocabulary and learned the target words by making use of the semantic-map method. According to the findings, the students who used the application to learn the vocabulary items improved their vocabulary knowledge more and were more engaged and motivated to learn the vocabulary than those in the control group.

Other studies have investigated the educational use of mobile devices to enhance vocabulary acquisition by integrating the text message function of mobile phones and vocabulary learning. Specifically, research conducted to explore the effectiveness of text messaging on vocabulary learning showed that spaced-repetition of the target vocabulary items enhanced students learning. In other words, the results indicated that the 'spacing affect' created by exposure to target words in fragmented intervals promoted the retrieval of these vocabulary items. (Thornton & Houser, 2005; Lu, 2008; Cavus & Ibrahim, 2009; Nwaocha, 2010; Zhang et al., 2011).

3. The study

As summarized in the previous part of this study, it is widely accepted that mobile devices are effective and efficient tools with effective pedagogical potential in terms of language learning and mastering language skills. Using mobile phones can enable teachers to provide an effective learning environment for their learners. Specifically, using such mobile devices helps learners to improve their vocabulary, increases their motivation and makes them become more autonomous. Therefore, the present study aims to investigate the effectiveness of Quizlet as a mobile tool for vocabulary learning, examine its impact on students' motivation and autonomy and also compares the use of this mobile tool with keeping a notebook while learning vocabulary in English. The study also attempts to find out the perceptions of students and their teacher about implementing such a mobile tool while learning, teaching and practicing vocabulary in an English language preparatory program. To meet these objectives, the following research questions were addressed:

1. Does using Quizlet as a tool to store and practice target vocabulary have an impact on students' performance in English vocabulary learning?
 - 1a. Is there any difference between using Quizlet and a vocabulary notebook in terms of the ability of students to use target vocabulary correctly?
2. How does Quizlet help students improve their autonomy in vocabulary learning?
3. What are the perceptions of students and their teacher about using Quizlet as a tool to learn, practice and teach target vocabulary?

4. Research methodology

4.1. Instruments

The study was carried out at a foundation university (non-profit, private) in Istanbul, Turkey. A nonrandomized quasi-experimental research design (a nonrandomized control group, pretest–posttest design) was employed in order to investigate the effect of the manipulated variable which was an implementation of the Quizlet flashcards program to store and study vocabulary. The data was collected through the use of mixed method data collection instruments, namely, qualitative data was gathered to complement the quantitative data. The primary data collection techniques adopted in this study were pre- and post-tests to gather statistical data, a Quizlet online survey, and semi-structured interviews to gather qualitative data - which is crucial in order to triangulate

the obtained findings. No alterations were made to the collected data and it was analyzed statistically and descriptively in an attempt to increase the validity of the research and obtain more dependable findings.

Based on the experimental research design, the participants in the experimental group received treatment whereas the control group had no treatment. The participants in both the experimental and the control group were given vocabulary pre- and post-tests. In order to gather more reliable findings and gain a deeper insight into the issue, semi-structured interviews were conducted with the students in the experimental group and a post-treatment survey was administered to explore the perceptions of students about using this digital tool to store and revise target vocabulary as qualitative data collection methods. Collecting quantitative data through pre- and post- tests and qualitative data via a Quizlet online survey and semi-structured interviews enabled the researcher to analyze the results statistically and thematically to attain triangulation.

4.2. Sampling

Assigning the population elements to treatment or control groups randomly is difficult and mostly not possible in many research situations (Ary et.al, 2010, p. 155), which is also the case in this study. For this reason, the researcher employed nonrandom procedures for selecting the participating members of the sample, and nonprobability sampling was used in this study. Therefore, a convenience sampling procedure was adopted in this quasi-experimental study and the research included a population of 40 students who were recruited from two intact pre-intermediate level classes of foreign language learners who were studying English for academic purposes at the Preparatory Program of a foundation (non-profit, private) university in Istanbul, Turkey.

5. Findings

5.1. The impact of Quizlet on students' vocabulary performance

In order to answer the first research question related to whether using Quizlet as a tool to store and practice vocabulary had any impact on the students' vocabulary performance, the pre- and post- test scores were analyzed through Friedman's ANOVA test. The following table presents the results:

Table 1. The Impact of using Quizlet on students' performance in vocabulary learning.

Groups	Pre-test				Post-test				N	χ ²	df	p
	M	SD	Min	Max	M	SD	Min	Max				
Exp	28.68	13.42	10	60	82.37	10.84	60	95	19	19.00	1	.000
Control	29.47	11.16	15	60	61.58	22.61	30	95	19	14.22	1	.000
*p<.001												

As shown in Table 1, there was a significant difference between the pre- and post- test scores of the students who used Quizlet over the course of eight weeks. The increase in the test scores were significant in the experimental group ($\chi^2 = 19.00$, $p < .001$), which shows that using Quizlet had a positive impact on learning target vocabulary items. The findings also indicated that the changes occurred in the test scores over the course of eight weeks were significant in the control group ($\chi^2 = 14.22$, $p < .001$). In brief, both groups made substantial progress regarding vocabulary knowledge over time.

In addition, to examine whether there was any difference between Quizlet and vocabulary notebook on the ability to use target vocabulary correctly, the mean scores of the pre- and post- tests of the two groups (experimental vs control) were compared. The following figure presents the descriptive statistics:

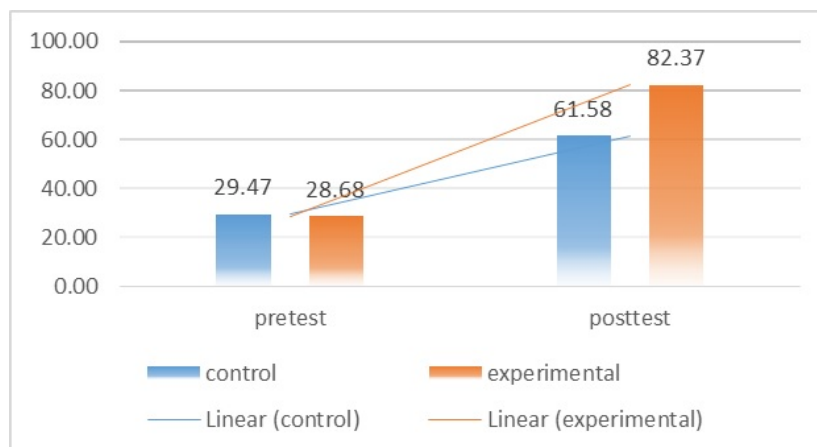


Figure 1. Comparison of the mean scores for control and experimental groups.

As shown in Figure 1, there was a substantial difference between the average grades of the two groups of participants. Specifically, even though keeping a vocabulary notebook enhanced the students' performance in vocabulary learning to a certain degree (32.11 points), the difference in the experimental group was much higher (53.69 points) which showed that Quizlet was a more effective tool to learn and revise target words.

5.2. The effects of Quizlet on promoting learner autonomy in vocabulary learning

As for the second research question of this study, which aimed to find out whether using Quizlet helps students to become more autonomous in vocabulary learning, data was gathered from the Quizlet online survey. The participating students were specifically asked to what extent they agreed with these three items: Quizlet increased my interest in studying vocabulary (item 2), I like Quizlet because I can access it to study vocabulary on my own devices (item 4), and I feel confident that I know the vocabulary after studying with Quizlet (item 8).

Before the survey including these items was administered, the Cronbach alpha score was calculated to ensure the reliability. The items in this category are shown in Table 2:

Table 2. Quizlet survey items to explore autonomy in vocabulary learning.

Quizlet enables students to become more autonomous vocabulary learners.	Items
Cronbach Alpha= .83	2. Quizlet increased my interest in studying vocabulary.
	4. I like Quizlet because I can access it to study vocabulary on my own devices.
	8. I feel confident that I know the vocabulary after studying with Quizlet.

The Cronbach alpha level was .83, which is an acceptable value (.70 to .95) (Tavakol & Dennick, 2011). After the reliability score was estimated, the frequencies and percentages of these items were calculated and are reported in the table below:

Table 3. Responses to the Quizlet survey items exploring autonomy in vocabulary learning.

Items	Response	Frequency	Percent
2. Quizlet increased my interest in studying vocabulary.	Strongly Disagree	-	-
	Disagree	-	-
	Neither Agree Nor Disagree	-	-
	Agree	5	25
	Strongly Agree	15	75
	Total	20	100
4. I like Quizlet because I can access it to study vocabulary on my own devices.	Strongly Disagree	-	-
	Disagree	-	-
	Neither Agree Nor Disagree	1	5
	Agree	5	25
	Strongly Agree	14	70
	Total	20	100
8. I feel confident that I know the vocabulary after studying with Quizlet.	Strongly Disagree	-	-
	Disagree	-	-
	Neither Agree Nor Disagree	3	15
	Agree	5	25
	Strongly Agree	12	60
	Total	20	100

As shown in Table 3, for item 2, the students were asked to report whether Quizlet boosted their interest in studying vocabulary. After using Quizlet to learn target words and study out of class time for 8 weeks, all of the students agreed (25%) or strongly agreed (75%) that this application increased their interest in studying vocabulary on their own devices.

In addition, the survey item 4 was aimed at exploring whether accessing Quizlet on their own mobile devices increased students' autonomy in vocabulary learning. Almost all of the students agreed (25%) or strongly agreed (70%) that they liked Quizlet since it could be accessed through a mobile device in order to study vocabulary. The students were able to learn and study target words independently on the Quizlet application, which made them more autonomous vocabulary learners. They were also taught how to create their own sets by using Quizlet, and some students created new flashcard sets for other words that they were supposed to learn but not included in this study. This also indicated that using Quizlet on their own devices made them more autonomous learners in terms of learning the target vocabulary items and revising for vocabulary tests. These findings revealed that the students became more autonomous after using this tool.

Finally, the responses to item 8 revealed that more than half of the students (60%) strongly agreed that Quizlet increased their confidence in terms of learning the words. The majority of the rest of the participants (25%) agreed that they also felt confident after studying with Quizlet. Similarly, quite a number of the students in the experimental group reported that they study vocabulary by using Quizlet on the metro bus and bus while commuting. The students responded that they were able to type more easily on their mobile devices on public transportation, which is another reason why they prefer Quizlet to study vocabulary.

In brief, the findings revealed that Quizlet enabled students to feel and become more autonomous vocabulary learners. They enjoyed studying vocabulary with Quizlet, and they also agreed that studying vocabulary using this application made them feel more confident. Finally, the students' interests in studying vocabulary on their own out of class also increased after using Quizlet, which was another indication of autonomy in vocabulary learning.

5.3. The perceptions of students about using Quizlet to learn and practice target vocabulary

To find the perceptions of students regarding the use of Quizlet to learn and practice vocabulary, semi-structured interviews with 15 randomly selected students from both groups were conducted and analyzed using the qualitative data analysis software NVivo 11. The interviews were recorded and transcribed into written form so that it would be easier to analyze. Specifically, each student was asked 4 questions related to their experiences using Quizlet or keeping a notebook to learn and practice vocabulary.

First, the students clearly stated that they enjoyed using Quizlet as they found it accessible, easy to use and entertaining. The following excerpt clarifies this finding:

I like Quizlet a lot, because the game features are entertaining and I can access it everywhere on my smart phone. (Student interview, March 2018)

This quotation is only a sample answer given that represents the overall perceptions of the other participants. The words that were mostly repeated in the students' responses were connected to the entertaining features of Quizlet. The most frequently found words were 'enjoy, fun, game, entertain', which were repeated 11 times in total. Almost all of the students who were interviewed reported that Quizlet contributed to their learning a lot and it was a fun application to use.

Another frequently given answer was that Quizlet promoted vocabulary learning. Most of the students stated that they were able to learn the words in a fast and an easy way using Quizlet. The words 'learn, easily, easy, fast' recurred 16 times in the responses of the participants as emphasized in the comment below:

I feel that I can learn words easily when I study vocabulary on Quizlet. (Student interview, March, 2018)

On the other hand, while most of the comments by the students about using this mobile application were positive, there were a few students who felt a bit negative. As it was analyzed via NVivo, two students repeated the word 'distract'. Some of the participants particularly reported that studying vocabulary on a smart phone was somewhat distracting for them since their friends texted or sent instant messages while they were studying on the application as illustrated in this quotation:

I don't want to continue using Quizlet to study vocabulary in the future because my friends send me messages while I'm studying, and I get distracted. (Student interview data, March, 2018)

To summarize, the findings of the semi-structured interviews revealed that Quizlet serves as a very useful tool to store and revise vocabulary, which also enables students to expand their vocabulary knowledge by entertaining them and taking a relatively shorter time than the other vocabulary studying methods and strategies.

5.4. The perceptions of the teacher about using Quizlet to teach target vocabulary

To explore the teacher's perceptions about the use of Quizlet to teach vocabulary, the teacher kept a reflective diary for a period of eight weeks (40 days, 200 hours of vocabulary teaching in each group), which is summarized in the following part of this study.

First of all, the teacher created sets and added them to the class to share them with the students. Creating vocabulary study sets is very simple and it is certainly not a time-consuming task. The teacher used the unpaid teacher account and this allowed him to choose visuals for the vocabulary items from the suggested images, which are about eight or nine pictures taken from Flickr. However, the paid version lets the users upload their own pictures for the terms. Finding an appropriate picture for most of the words was very simple; however, for some abstract nouns or feelings, it was harder to assign a suitable visual. The excerpt below shows the teacher's opinion about this minor problem:

I created the sets for the following eight weeks to use with my students and it was not a difficult task to do. The only problem I had was finding pictures for some words like 'urgent, complaint, etc.', however it was very easy to find a suitable image for the rest of the words. (Teacher reflective journal, March 2018).

Furthermore, before the students started using the application, the teacher taught them how to sign up and join the class, and how to use each function of Quizlet. He reported that the students had no difficulties in signing up since they were able to use their Google or Facebook accounts to become a member. After the students learned how to use the different features of the application, they downloaded it from Play Store or App Store, based on the operating system of their mobile devices, and they were given twenty minutes to study the first set created by the teacher and explore each function briefly. Finally, the teacher stated that the students seemed quite happy while they were studying the set and they all stayed on task during this period, which can also be seen in the comment below:

The students seemed quite excited about using the application and they all enjoyed the Audio function, which helped them to learn the correct pronunciation of the words. Seeing my students having fun and learning at the same time made me feel very happy. (Teacher reflective journal, March 2018).

After the students studied the first set on their own by exploring each available function of Quizlet on a mobile device - Cards, Learn, Match, and Test - the teacher demonstrated how to use the Spell and Gravity features that are only available on the Quizlet website. Each student was given a chance to use the Spell feature and play the Gravity game at least once. They all enjoyed using these features too, they especially liked the Gravity game since the task in this game is really an exciting one, which is to protect their planets from incoming asteroids (e.g. the definitions of the target words) by destroying them (typing the terms in correctly) before they reach the ground. The following excerpt describes how the students' and the teacher felt while playing this game:

The students loved playing the Gravity game since it adds game features and time pressure to typing the words correctly and creates an exciting atmosphere in class. I felt very happy because my students were learning target words by trying to beat the clock in this game and entertaining themselves at the same time. (Teacher reflective journal, March 2018).

For the last ten minutes of the lesson, the students played Quizlet Live game, which is a newly added feature to the Quizlet website. This is a whole-class team-based game, which not only enables students to revise the vocabulary items but also helps them to build soft skills. Each student needs to have a mobile device or a laptop to play the game, and they all played the game on their smartphones on that day. The teacher created the game by using the same set that the students had just studied and the students joined the game by going to <https://quizlet.com/live> and entering the unique join code assigned for that game and their names. The students were distributed to randomized teams of 3 or 4 and worked together to match all of the words in the set to the definitions correctly in a row to win. The students in the same team have the same

question but only one of them has the correct answer in this game. It reinforces the vocabulary and enhances communication among the students. The following excerpt shows how much the students and the teacher enjoyed this new game:

At first, the students weren't able to understand how to play the game even though I explained the logic behind it. They had difficulties in realizing that they needed to work together to find the term that matches the definition, since none of them has all of the answers. However, after a very short time they were all enjoying themselves and trying to win the game. (Teacher reflective journal, March 2018)

Moreover, the teacher used Quizlet over the course of the following weeks to teach the selected words for this study. The students were usually presented with the vocabulary items through a listening or a reading text and they were given some time to guess the meanings from the context before they started learning them on Quizlet. The students were able to guess the definitions of some words by giving the Turkish meanings, but they were not able to explain them in English. The teacher stated that the students were able to define the words in English after studying them on Quizlet and this shows that they can learn the English definitions easily with the help of different functions of this application. The following quotation illustrates this:

The students were able to guess the Turkish meanings of some of the target words like 'development' since they already knew the meaning of the verb form of this noun. However, they didn't know the English definitions of these words. After they were given fifteen minutes to study these words, they were able to define the words in English, this really made me happy. (Teacher reflective journal, March 2018)

Besides, the students were also told to revise the vocabulary items they learned out of class time, i.e., at home, on public transport, or during the two-hour break time at school, on their mobile devices or on a computer. The unpaid version of Quizlet and its features were utilized for this study and it was not possible for the teacher to track the class progress, view each student's activities on the application, or obtain class-wide data to see which terms were missed most often or how well the students learned the terms, which are some of the features of an upgraded teacher account. Nevertheless, the teacher was able to open each student's profile and check individual activities of the students for the assigned sets in the unpaid account. The free account also allowed the teacher to see the top scores for the Match and Gravity game and check on the students' activities to see whether they completed Learn or Spell out of class. The students' progress was checked by the teacher throughout this study and they were asked to spend at least half an hour every day out of class time to revise the words they learned. The following excerpt also shows how the teacher felt about this issue:

It might be more convenient to get a paid teacher account, but I am still able to track my students' individual progress in and out of class. Today, I got very happy upon seeing that almost all of my students completed the Learn and Spell, and most of them played the Match and Gravity games several times to beat each other's scores. (Teacher reflective journal, March 2018)

In spite of these differences between the paid and the unpaid teacher account, Quizlet is still a useful and effective tool to expand the students' vocabulary knowledge by motivating them to study more and make even the less interested students eager to learn the target words with the help of games. It is obvious that they favor Quizlet Live game over Gravity or Match, as shown in the following excerpt:

The lessons start very early and most of the students feel sleepy. Today, I was supposed to teach some target words in the first lesson, and the students didn't seem interested in the reading that presented the target vocabulary items. However, when I told them to start studying the set and that we were going to play the Quizlet Live game afterwards, they got happy and motivated. (Teacher reflective journal data, March 2018)

To wrap up, the comprehensive analysis of the findings of the reflective journals revealed that utilizing Quizlet as a mobile tool is favored by the teacher over vocabulary notebooks to introduce or teach the target words to the students. Additionally, the

teacher found this tool very helpful since it turns in-class revision of the target lexical items into a more entertaining game for the students. According to these findings, it is obvious that Quizlet is an effective tool that facilitates vocabulary learning in language classroom.

6. Discussion and conclusion

The findings of the present study revealed that Quizlet had a significant influence on the participating students' performance in vocabulary learning in the treatment group. Specifically, the ANOVA test showed that there was a significant difference between the pre- and post- test scores of the students who studied the target vocabulary via Quizlet. This significant difference between the pre- and post- test results of the treatment group indicates that the vocabulary retention can be attributed to the benefits of using flashcards and computer assisted language learning (CALL) with multimedia capabilities. These multimedia capabilities also support the findings of Mayer's (2005) study regarding the impact of Quizlet flashcards program on students' performance in vocabulary learning, indicating that the use of words and visuals together leads to better learning. The impact Quizlet had on students' performance in vocabulary learning and vocabulary retention can be attributed to dual coding theory (DCT), which is based on the principle that nonverbal and verbal systems are cognitively monitored subsystems that can activate one another. Therefore, the interconnected memory codes facilitate learners' recall of the target vocabulary items more than through the use of a single code (verbal or imagery) (Paivio, 1971).

Moreover, the results were in line with the study conducted by Basoglu and Akdemir (2010) who attempted to investigate the effectiveness of using flashcard applications to study vocabulary in undergraduate students' English vocabulary learning performance. The findings regarding the difference between using Quizlet and a vocabulary notebook in terms of the ability of students to use target vocabulary correctly and the main reason why mobile tools are more effective than vocabulary notebooks can also be seen in the recent research studies carried out in the field, which all conclude that mobile-assisted language learning tools provide the required amount of exposure to learn target vocabulary items (Thornton & Houser, 2005; Clark, 2013; Wang et al., 2015). The findings are also congruent with those of previous studies supporting the effectiveness of digital learning tools in that learning vocabulary through these types of mobile-based applications is a more effective method than studying and revising vocabulary items by means of paper-based strategies and tools. (Altiner, 2011; Azabdaftari & Mozaheb, 2012; McLean, Hogg, & Rush, 2013).

In addition, regarding how Quizlet helped students to improve their autonomy in vocabulary learning, similar results were gathered from Dizon's (2015) study which revealed that Quizlet is a useful and effective tool which promotes vocabulary acquisition and autonomy in vocabulary learning. Similarly, Kim et al. (2013) also found that students expressed positive feelings about using their own mobile devices which helped them to have a personalized learning experience out of class time.

This study found that the students who learned the target words through the different study and play features of Quizlet felt this mobile tool to be an easy and accessible tool to store, study and practice vocabulary. They asserted that using Quizlet made them feel confident that they learned the vocabulary items, and its game and study features enabled them to recall the newly acquired words easily and quickly. In sum, Quizlet was perceived to be quite easy to use by all the participants, which is also supported by Kálecký's (2016) study. Similarly, in studies conducted by Oblinger (2005) and Tran (2016), the majority of the learners enjoyed technology-based learning, which led to positive learner attitudes and helped them to enhance their vocabulary knowledge. Additionally, Kennedy and Levy (2008) and Stockwell (2010) also showed mobile applications and programs as more motivating and efficient tools to store and revise vocabulary.

Apart from the perceptions of the students, the teachers also had positive perceptions about implementing a mobile tool in their classroom practices which was parallel with Ghrieb's (2015) research indicating that both teachers and students have mostly positive attitudes towards the potential use of MALL to improve listening, speaking, and

reading skills as well as to reinforce vocabulary. Saidouni and Bahloul (2016) also supported the fact that the overall attitudes of students and teachers towards using mobile tools are mostly positive.

The overall findings of this study underscore the value of integrating mobile-assisted language learning and teaching tools like Quizlet into EFL teaching practices and curriculums, since it was found to be an effective and useful application that promotes students' performance and autonomy in vocabulary learning by providing them with spaced repetition and increased exposure to the target words through various functions and a game-like atmosphere to study and acquire the target vocabulary using their mobile devices both in and out of class. Based on all of these findings, it can be suggested that Quizlet and its functions should be used not only to teach the target vocabulary items in a language classroom by the teachers but also to learn and practice the target vocabulary by the students in and out of class time. It should be noted that this tool had a strong impact on vocabulary learning and retention, therefore, material designers and curriculum developers need to take notice of flashcard software programs while designing course materials or developing new educational tools. Flashcard applications have the potential to enable learners to acquire a greater number of words even over short periods of time since they promote intentional vocabulary learning with the help of increased exposure to the target lexical items by means of spaced-repetition. These findings also highlight the inevitable shift towards computer-supported collaborative learning (CSCL), which asserts that collaborative learning needs to be fostered through integrating technological tools into educational contexts to lead to more secure learning outcomes.

The use of flashcard applications and various features of these tools allow learners to retrieve the vocabulary items from their memory. EFL teachers may therefore assist students to develop effective strategies in order to be able to study using flashcards for self-testing or retrieval of the target words and revision through spaced-repetition. The majority of the participating students enjoyed spending a considerable amount of time without getting bored in and outside class time while studying on Quizlet, further demonstrating its effectiveness as a learning tool. Therefore, the students need to be informed about the boosting effects of intentional vocabulary learning and teachers need to motivate them to study deliberately on their own out of the class. In addition, the findings also indicate that using mobile learning and teaching tools increases autonomy in vocabulary learning by providing students with the opportunity to study and practice the target vocabulary on their own in a more entertaining and motivating way. As a result, mobile devices should be incorporated in language classrooms to aid students in their retention of target words and promote the enhancement of autonomy in vocabulary learning as well.

In order to throw more light on the issue and to get a deeper analysis, the qualitative data obtained from the semi-structured interviews and reflective journals indicated that both teachers and students perceived using a mobile tool to store, practice, and teach vocabulary in and out of class quite positively. The results of the current study also confirmed that explicit vocabulary learning through the use of a mobile flashcard program enabled learners to obtain better learning and retention outcomes.

In brief, learning the target words deliberately through the use of digital flashcard applications like Quizlet can and should be used to motivate the students, promote autonomy in vocabulary learning for lexical development in and out of class, and provide individual and collaborative learning opportunities.

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