

Utilizing Computer-Assisted Vocabulary Learning Tools in English Language Teaching: Examining In-Service Teachers' Perceptions of the Usability of Digital Flashcards

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Utilizing Computer-Assisted Vocabulary Learning Tools in English Language Teaching: Examining In-Service Teachers' Perceptions of the Usability of Digital Flashcards

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ABSTRACT

This study explores five in-service teachers' perceptions with regards to the technical and pedagogical usability of digital flashcards in English language teaching. All the teachers were enrolled in a one-year Masters of Art in English Language Teaching program at Coventry University and had previous teaching experience ranging from elementary to university level. The study adopted a quan→QUAL mixed-method research design, combining elements of surveys and case studies, to examine the factors that affected the teachers' perceptions in addition to how they view three specific websites: Cram, Quizlet, and StudyStack. Participants explored these websites and created sets of flashcards in a computer lab, then completed a survey and participated in a focus group interview. Findings suggest that although the teachers were willing to integrate digital flashcards in their future teaching, it is dependent on several factors, including: learners' age, the quality of graphics in the websites, and the teachers' prior experience as students on their MA program. Nonetheless, the "wow" factor seemed to influence their perceptions of the usability of these websites, which can either be extreme positive or negative initial reactions as a result of the websites' presentational scheme.

KEYWORDS

Affordances, CAVL, Digital Flashcards, English Language Teaching, Usability, Websites

INTRODUCTION

For an extensive period of time during the history of language teaching, the development of grammatical knowledge was believed to be more essential than lexical knowledge, given that many educators thought that the role of vocabulary was simply to provide context for learning grammar (Carter & McCarthy, 2013; Folse, 2004; Klapper, 2006; Laufer & Nation, 2012). However, recently, there has been a consensus among students, teachers, material writers, and researchers that learning vocabulary is a crucial part of mastering a second language (Schmitt, 2008). Furthermore, it is a good indicator and an essential element of success in other areas of language (Maley, 2013).

Vocabulary learning is a cumulative process (Klapper, 2006) and can be acquired incidentally or deliberately. Early research in vocabulary acquisition presumed that the former was more important in expanding learners' vocabulary, where words in the second language (L2) are picked up by students during their exposure to authentic texts and interaction (Klapper, 2006). Conversely, Schmitt (2008) and Nation (2013) specify that research has shown that direct deliberate learning surpasses incidental

learning in terms of the number of words learned and the time taken to learn them. Still, a well-designed L2 vocabulary learning program need to have a balance between these two types (Nation, 2013; Schmitt, 2008).

L2 learners continually refer to their lack of vocabulary knowledge as an area in which they are deficient in, acknowledging that it is a significant part of their language learning success (Folse, 2004). Teachers need to recognize the vocabulary challenges that their learners might face (Schmitt, 2007), since it is nearly impossible to teach all the words L2 learners will encounter or need to use due to the limited time available in the classroom (Maley, 2013). For L2 learners, a large proportion of their vocabulary learning is acquired through deliberate study (Nation, 2013). Hence, it would be more advantageous for teachers to expend the restricted classroom time they have in teaching their learners strategies that will help them tackle vocabulary independently instead of trying to teach them every word they come across (Schmitt, 2007). One strategy for deliberate vocabulary learning is the use of flashcards, which is advocated by various experts such as Klapper (2006), Nakata (2011), and Nation (2013). Flashcards are usually a set of cards, through which an association between an L2 word form and its meaning is created; usually the L2 word is written on one side of the card and a translation in the student's first language, L2 synonym, or L2 definition is written on the other side (Nation, 2013). Flashcards can be created either manually or digitally using computer-assisted vocabulary learning (CAVL) tools.

CAVL tools can provide a range of vocabulary learning opportunities for students. Nation (2013) asserts that there are several advantageous characteristics that distinguishes CAVL from other ways of learning. For instance, CAVL can provide quick and easy access to a varied range of resources, such as digital flashcard websites, vocabulary lists and exercises, online dictionaries, and video games. CAVL can also be used to monitor and control users' learning conditions, present immediate feedback on success and progress, and adapt to learners' performance by storing it and provide materials that are most suited to the current level of the learner. However, Nation (2013) argues that research regarding CAVL has yet to provide convincing or impressive results, which may be due to the relative newness of it and the need for developing programs that maximally exploit its advantages. This suggests the need to be aware of the affordances of different CAVL tools if teachers want to successfully integrate them in the language classroom.

BACKGROUND OF THE STUDY

A number of studies (Chien, 2015; Hung, 2015; McLean, Hogg, & Rush 2013; Nakata, 2011) have focused on using flashcards for learning vocabulary, and researchers are currently shifting their concentration towards the use of digital flashcards, as opposed to paper flashcards. Using digital flashcards can be beneficial, particularly when a learner's performance is tracked and the sequence of the flashcards is controlled to provide more practice in unknown words (Nakata, 2011). Enabling users to create their own flashcards or use sets designed by their teachers or other learners could potentially make learning more effective. In addition, users can access them anywhere and anytime when connected to the Internet, without the need to carry the paper-based ones around (Chien, 2015). The multilingual support to flashcards and enhanced presentation attributable to the option of incorporating multimedia, such as audio and pictures, are also beneficial to learners (Nakata, 2011).

McLean, Hogg, & Rush, (2013) attempted to measure the vocabulary growth of Japanese EFL learners, in their first year at the university level, after one year of weekly digital flashcard website use. Using pre-tests and post-tests, they compared three groups, concluding that the use of Word Engine with the treatment groups contributed to learners' receptive vocabulary knowledge relatively quickly in comparison to the control group. Chien (2015) compared Taiwanese college students' perceptions and attitudes toward three digital flashcard websites and their corresponding apps: Quizlet, StudyStack, and Flashcard Exchange. Findings included that participants had positive attitudes towards the use of these websites to improve their vocabulary, even though they mainly offered form and meaning

activities as categorized by Nation (2013). Chien (2015) also included suggestions to the websites, such as having more user-friendly guidelines.

The aforementioned studies focused on the effectiveness of digital flashcard websites on learners, concentrating on their perceptions and performance prior to and after using digital flashcards. It needs to be noted that training learners in any vocabulary learning strategy requires time and effort, with an estimation that each strategy necessitates that teachers spend at least four to five hours weekly in training their learners (Nation, 2013). In terms of digital tools, teachers themselves need to establish the affordances of digital flashcards to decide on both their value and appropriateness and whether they will incorporate it in their classrooms. One way to determine the affordances of digital flashcards is by looking at the usability of the websites dedicated to them, using a methodological framework for courseware and website evaluation, such as Hubbard's (2011). Hubbard's framework focuses on six main aspects, which include the technical preview of the software, its operation description, teacher fit, learner fit, and implementation scheme in addition to appropriateness judgement. This principled approach to evaluating CAVL tools can help reduce the "wow" factor, which can include both extremely positive and negative initial reactions towards a program, and may influence users' opinions of the tool as a whole (Murray and Barnes, 1998).

PURPOSE OF THE STUDY

To date, there has not been sufficient research that examines teachers' perceptions of digital flashcard websites. It would be worthwhile to establish whether the likelihood of teachers' integrating this tool in their practice is affected by their perceptions. The overall aim was to investigate the affordances of using current digital flashcard websites and how in-service teachers on a Masters of Art in English Language Teaching (MA ELT) program perceive the usability of three digital flashcard websites. Usability, in this context, refers to both the technical and pedagogical aspects of these websites. By obtaining in-service teachers' views of the websites, an added understanding of potential issues that teachers may face when integrating digital vocabulary tools in the classroom may be achieved. The overarching research question of the study is the following: how do in-service teachers perceive digital flashcard websites? This question is tackled by investigating:

- What are their perceptions regarding three specific websites in terms of technical and pedagogical usability?
- What are the factors that affect their perceptions?
- Whether they will integrate digital flashcard websites in their future practice

METHODOLOGY

Beatty (2010) asserts that creating "a better fit between good pedagogy and technology continues to be an ongoing challenge" in CALL (p. 206), citing case studies and surveys as two methodological approaches to different types of CALL research. As a small-scale short-term research, this study drew on elements of survey and case studies. For instance, a particular group of in-service teachers were purposefully chosen and invited to explore digital flashcard websites in an artificial setting, a computer lab, as they were not full-time teachers. Therefore, the sampling and theme of this study aligned with those of case studies, as it attempted to "study a phenomenon at a particular point in time to better understand the inputs and outputs that impact upon it" (Beatty, 2010, p. 224). In addition, in CALL evaluation, surveys are frequently utilized and considered to be useful instruments in gathering teachers' reactions towards websites (Levy & Stockwell, 2006).

A mixed-method research design was used, including two instruments: a questionnaire survey with Likert-scale statements and open-ended questions and a semi-structured group interview. Based

on Dörnyei's (2007) classification of different types of mixed-method research, this study adopted the quan→QUAL model and consisted of two phases, with the second, qualitative phase dominating and having an increased weight in the data analysis. Even though the data analysis mainly focused on the qualitative data retrieved from the open-ended questions in the questionnaire and focus group interview, it also included some quantitative data resulting from the use of six-point Likert-scale questions.

Participants

Purposive sampling was applied to select the participants for this study, as suggested by Dörnyei (2007) with regards to quan→QUAL design. Firstly, due to feasibility issues, only teachers on MA ELT program at Coventry University, United Kingdom, were considered. Secondly, as the study aimed to look at both the technical and pedagogical usability of CAVL tools in English language classrooms, only in-service teachers who took two specific courses were included. The first course, "Computer Assisted Language Learning (CALL): Past, Present, and Future", covered various topics, including the definition of CALL, evaluation of apps and websites, and the authoring of materials. The purpose of selecting in-service teachers with CALL training was because "language teachers who are not accustomed to looking at CALL software may perceive its purpose very differently than those who are more experienced" (Bradin, 1999, p. 159). The second course, "Designing Language Training Materials", covered topics such as the evaluation of published materials, learners' needs analysis, and developing vocabulary teaching materials. The combination of these two courses offered the teachers valuable skills and experience in both material selection and evaluation. The selected participants, four females and one male, ages ranging from 20-34, offered pivotal significance to the study because of both their educational and teaching backgrounds (See Figure 1). They came from diverse backgrounds, which included the Kingdom of Bahrain, Indonesia, Pakistan, and the United Kingdom. Their teaching experience with L2 learners ranged in terms of length and level, which varied from primary or elementary to university level (see Table 1 for an overview). Participants were given a pseudonym to maintain anonymity and confidentiality.

Digital Flashcard Websites

Chien's (2015) study provided insight into first-year college students' perceptions of three specific digital flashcard websites. This study utilized the same websites to examine in-service teachers' perceptions towards the technical and pedagogical usability of the same websites, which were: Cram, Quizlet, and StudyStack. At the time of Chien's (2015) study, Cram was known as Flashcard Exchange. Although the rationale behind his choice of websites was limited to only three requirements, which included learners' ability to create their own flashcards, being free of cost, and the ease of signing up or logging in, additional criteria were considered in this study.

Firstly, the websites had to have apps as well, with Quizlet and Cram being available on both iOS and Android, and StudyStack on Android. The purpose of selecting websites that had smartphone interfaces is to ensure that learners have the flexibility to choose when and where they want to access the flashcards. Secondly, the websites were recommended to Green and Bailey (2010) by numerous students, who were primarily high school and undergraduate university level students, as three of the most commonly used digital flashcard websites. Thirdly, they were evaluated using Nakata's (2011) criteria by Chien (2015). Quizlet was also evaluated by Nakata (2011) and Dang (2015). Nonetheless, to give a more current overview of the websites, they were re-evaluated Nakata's (2011) criteria, supplemented by Chien (2015) and Dang's (2015) inputs (See Tables 2 and 3).

Instruments

Two main instruments were used in the data collection process: a Bristol Online Survey (BOS) questionnaire and a semi-structured group interview. In combination, the questions used in both instruments were based on Hubbard's (2011) methodological framework for website evaluation, which was selected because it is considered to be pivotal by many (e.g., Blake, 2013). To ensure validity of

Figure 1. Process of participant selection

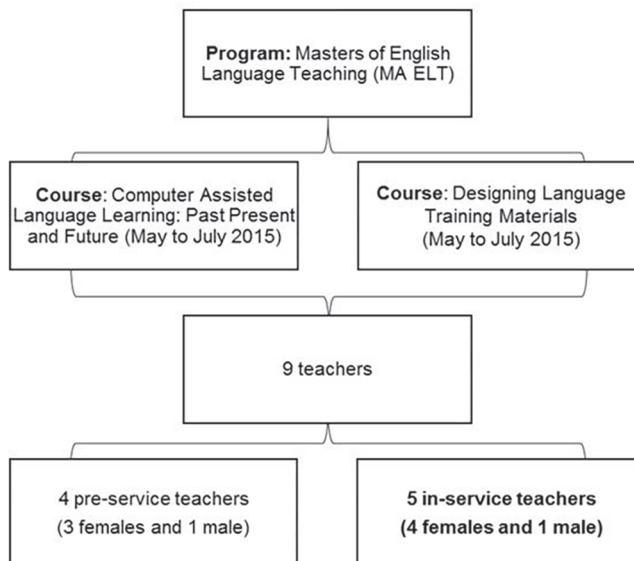


Table 1. Demographic characteristics of participants

Participant	Gender	Nationality / First Language	Age	Teaching Experience	Grade Level	Self-Rated Computer Skills Level	Number of years of computer use
Amira	Female	Pakistan / Urdu	30-34	10 years or more	College / University	Intermediate	11-15 years
Bethany	Female	United Kingdom / English	25-29	3-5 years	College / University	Intermediate	16 years or more
Sarah	Female	Bahrain / Arabic	20-24	1-2 years	Intermediate	Basic	11-15 years
Dana	Female	Bahrain / Arabic	20-24	1-2 years	Primary / Elementary	Intermediate	16 years or more
Evyavan	Male	Indonesia / Bahasa Indonesia (Indonesian)	20-24	3-5 years	College / Level	Intermediate	11-15 years

Table 1 Demographic Characteristics of Participants

the study, two forms of triangulation have been attempted (Dörnyei, 2007). Method triangulation was attempted by using two data gathering procedures, which included the use of questionnaires and focus group interview. The Likert-scale type statements in the questionnaire provided quantitative data, while the open-ended questions and focus group interview provided qualitative data. The findings of both methods were utilized to give a better overview of the participants’ perceptions. Secondly, respondent validation was sought by giving the findings to the participants for verification, as the emphasis of the study was placed on “uncovering participant meaning” (Dörnyei, 2007, p. 60).

Table 2. Overview of the three websites using Nakata's (2011) criteria for flashcard creation and editing

Flashcard creation and editing			
	Cram	Quizlet	Study Stack
1 Flashcard creation	Yes	Yes	Yes
2 Multilingual support	Yes; with additional pop-up keyboard which includes letters that are not in the Roman alphabet	Yes; with additional pop-up keyboard which includes letters that are not in the Roman alphabet	Yes
3 Multi-word units	Yes	Yes	Yes
4 Types of information	Optional images from the website or can be uploaded by user, user-recorded pronunciation with upgrade, Definitions from other Quizlet users	Meaning, 8 optional images from Quizlet or uploaded by user, user-recorded pronunciation with upgrade, Definitions from other Quizlet users	Meaning
5 Support for data entry	No; Only images	Yes, definitions from other Quizlet users and images from	No
6 Flashcard set	Yes	Yes	Yes

Table 2 Overview of the three websites using Nakata's (2011) criteria for flashcard creation and editing

Table 3. Overview of the three websites using Nakata's (2011) criteria for learning on flashcard software

Learning			
	Cram	Quizlet	Study Stack
1 Presentation mode	Yes	Yes	Yes
2 Retrieval mode	Yes	Yes	Yes
3 Receptive recall	Yes	Yes	Yes
4 Receptive recognition	No	Yes	Yes, using the Quiz button
5 Productive recall	Yes	Yes	Yes
6 Productive recognition	Yes	Yes	Yes
7 Increasing retrieval effort	No, but tabs are organized using 'Flashcards' 'Memorize' 'Test' and then 'Games'	No	No
8 Generative use	No	No	No
9 Block size	Determined by user	Determined by user	Determined by user when using Study Stack option (not Flashcard)
10 Adaptive sequencing	Yes, in the 'Memorize' section, the items that the user got it wrong will be taken to Round 2, where they will be asked again. However, the learner determines if he/she got it correctly or not.	No	No, but the user can separate the cards from what he/she knows and doesn't know.
11 Expanded rehearsal	No	No	No

Table 3 Overview of the three websites using Nakata's (2011) criteria for learning on flashcard software

Data Collection Procedure

To ensure that all participants had an identical opportunity to explore different features of the websites, they were invited to attend a three-hour session in a computer lab on campus. Using a simulated setting ensured that all participants had the same access to the hardware and software. As the study was not aimed at checking cross-browser compatibility, they were asked to use Google Chrome to ensure that the websites were accessed using the same browser.

Furthermore, pre-prepared words and definitions were provided for the participants, considering that the goal was for them to focus on the websites rather than spending time choosing the words to be incorporated in the creation of the flashcards. Four elementary level books were examined to look for common themes: *New Headway Elementary Student's Book* (Soars and Soars 2011), *New Cutting Edge Elementary* (Cunningham, Moor, & Eales 2005), *Innovation Elementary Coursebook* (Dellar and Walkley 2005), and *New English File Elementary Student's Book* (Oxenden, Latham-Koenig, & Seligson 2004). Chosen themes were related to jobs and places found in the city, seeing that these themes could be relevant to multiple contexts. The definitions were taken from the mini-dictionary that was included in the *New Cutting Edge Elementary* coursebook for learners (Cunningham, Moor, & Eales, 2005). The purpose of retrieving definitions from a textbook was to provide the in-service teachers with materials that they might come across in their practice, in addition to different types of knowledge attached to the words, such as the form, meaning, grammatical function, phonemic spelling, plural form, and sample sentence. Participants were encouraged to make the flashcards depending on the information they thought might be useful and relevant to learners in their own contexts.

Questionnaire and Session Procedure

First, participants completed the first section of the questionnaire. The questionnaire included two main sections, with the latter comprising of three sub-sections. The first section included factual questions to establish the demographic profile of the participants, such as the gender, age group, teaching experience, and computer skills. It also included behavioral questions that focused on participants' prior experience with the use of CAVL tools as both learners and teachers. The purpose of including these questions was to establish the different aspects of the teachers' backgrounds that may have an effect on the likelihood of them adopting CAVL tools in their practice.

Then, they were given a set of instructions to help guide the session, with several steps for each website, and spent at least thirty minutes on each website one at a time. After exploring each website, they completed the second section in the questionnaire. It included two subsections of attitudinal questions that were replicated for each website, making them a total of six subsections. The first main subsection incorporated Likert-scale type statements that were adapted from different questionnaires or created to help the in-service teachers determine the usability of the websites. The other subsection included open-ended questions to get an overview of the teachers' perceptions of each website. Open-ended questions were specifically included in order to have a better overview of the quantitative data obtained using the Likert-scale items, as recommended by Dörnyei (2007).

To explore the websites, the links were not provided to the participants to let them access it using their preferred search engine to check how discoverable they were. The websites were ordered alphabetically to reduce investigator bias, and participants were asked to register or log in on all three different websites to determine how easy or difficult the process was. Participants searched for pre-existing sets to check whether flashcard sets relevant to their specific context were available. This was based on Blake's (2013) assertion that CALL evaluation should be sensitive to the local contexts in which it will be used. Subsequently, they created L2-L1 flashcards to check whether the websites support their first languages and to determine if they will be able to use it in their local contexts. Furthermore, Nation (2013) recommends the use of L1 language translations in flashcards, as he maintains that it generally more useful to learners.

Semi-Structured Group Interview

As the participants were colleagues with a collective experience of both courses and the exploration of the websites, a group interview was selected as the second instrument in this study. The primary investigator was also a colleague on the same course. A focus-group interview format was used to yield a deep and insightful discussion about digital flashcard websites, where the interaction within the group was more important than participants interacting with just the researcher one at a time (Cohen et al., 2011; Dörnyei, 2007). Because all the participants were involved in exploring the websites at

the same time and order, it enabled the researcher to engage the participants in a “stimulated recall or retrospective” interview (Dörnyei, 2007), where they talked about their experience and perceptions towards the features on the websites.

Data Analysis

For the survey, the coding process for the Likert-scale items was straightforward. The ordinal data from six pre-determined responses were combined into two categories: Agree and Disagree. The number of agreement for each digital flashcard website was then placed in a table to facilitate comparison between them and each set of items was converted into a bar chart, which will be presented in the results section.

A few tactics, suggested by Miles and Huberman (1994), to coding data include counting frequency of occurrence, noting patterns, and clustering or categorizing, were used to generate meaning from the data as a way to reduce data overload and enable ongoing analysis, interpretation, and conclusion-drawing. An exploratory—interpretive qualitative approach to coding data retrieved from the open-ended questions in the questionnaire and the focus group interview was applied. The interview was first transcribed in a Word Document and then transferred into a Computer-Assisted Qualitative Data Analysis Software: NVivo 11. NVivo was used to ensure that the analysis process was well-organized and more efficient than manual coding. Cohen et al. (2011) illustrate that “there is no single or correct way to analyze and present qualitative data; how one does it should abide by the issue of fitness for purpose” (p. 537). As the purpose of the study was to determine the participants’ perceptions of the technical and pedagogical usability of the websites, the data was coded based on the emerging themes and the themes were subsequently grouped based on Hubbard’s (2011) methodological framework for website evaluation.

RESULTS AND DISCUSSION

The results and discussion of the findings are sectioned under the three research questions.

What Are In-Service Teachers’ Perceptions Regarding Cram, Quizlet, and Studystack in Terms of Technical and Pedagogical Usability?

Technical Usability

Since the study looked at digital flashcard websites, the first issue that was brought up by the participants in the survey and focus group interview was the accessibility to computers and the Internet, highlighted in the extract below (Focus Group, 26 November 2015):

- **Sarah:** “... The other thing I have is that in my school the Internet isn’t always working. If they are online, I have to open [the digital flashcard websites] in the classroom, and if the Internet is not working, that would be a problem”.
- **Dana:** “... I’ve been in a lot of situations where my laptop wouldn’t work, the presentation wouldn’t work, and the website wouldn’t work”.
- **Amira:** “In Pakistan, we have the problem of electricity, we call it ‘load-shedding’”.

The three free-of-charge websites had corresponding smartphone apps; both Cram and Quizlet have iOS and Android apps, while StudyStack has only an Android app. In the interview, Dana was wondering if the app on StudyStack can be accessed as a website on an iPhone, and Sarah replied, “Yeah, I don’t think. It’s not even computer-friendly”.

With regards to the different Likert-scale statements concerning the technical aspects in the survey (Figures 2 and 3), Quizlet was rated more favorably than Cram and StudyStack, as all the participants generally agreed with the statements. Interestingly, the mixture of participants’ opinions

was most noticeable in terms of the presentational scheme (screen layout) of the websites, as the level of agreement varied amongst participants. This is represented in the bar chart below (Figure 2). StudyStack received the lowest degree of general agreement, particularly concerning its use of color and graphics. The design of the website was disliked by all the participants, as they stated in the open-ended questions and the focus group interview that it was “outdated”, “old-fashioned”, “crowded”, and had a lot of information “jammed into a little space”. Two participants were particularly irritated with the advertisements on StudyStack and Quizlet, mentioning that they came across a misleading advertisement on StudyStack which had the word “flashcards”. When they clicked on it, it took them to an entirely different page.

In the interview, the participants elaborated that on StudyStack’s use of colors, which appeared to be an important aspect that influenced their general opinion of the websites, as seen in the extract below:

- **Sarah:** “... Cram looked nice but the design was too minimal. So, like it’s too minimal you can’t even find the options or things, whereas with StudyStack it’s the exact opposite. [Bethany: Yeah] everything is just like there in your face. And you are like, ‘Where do I look? What do I read? What do I do?’”
- **Bethany:** “Yeah, too much the other way.”
- **Sarah:** “Too many colors, as well. I had to squint because the hyperlinks were kind of blue and the background was kind of green. It was kind of too similar. It was distracting.”

The participants mostly agreed with all the statements in terms of discoverability and product design of the websites in the survey (Figure 3). However, even though they also agreed that it was easy to learn to use the websites, four participants felt they needed more assistance in StudyStack when creating the flashcards (Figure 4). They either read additional instructions or asked their colleagues for help. The amount of instructions was thoroughly discussed in the interview, as participants could not agree how sufficient the instructions were. Some preferred brief instructions, while others preferred them more detailed.

- **Bethany:** “... I’ve actually found StudyStack did actually have something at the side as I was creating [the flashcards] that told me what to do next. So, although I didn’t fully get it, I quite liked those step-by-step instructions.”
- **Amira:** “I actually don’t like a lot of instructions. I don’t like reading the instructions and then doing things, I like to do and learn. So although StudyStack did offer instructions, I didn’t like reading them.”

Figure 2. Participants’ agreement with statements regarding page/screen layout of websites

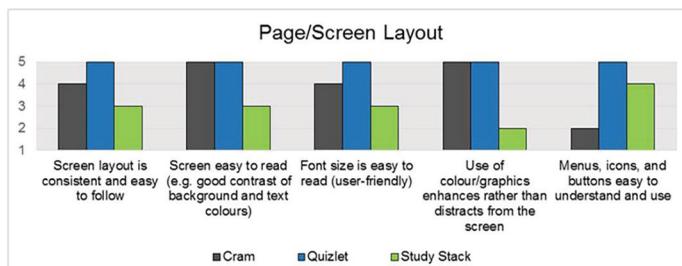


Figure 2 Participants’ Agreement with Statements Regarding Page/screen Layout of Websites

The participants were required to create both L2-L2 and L2-L1 flashcards during the session in order to answer the questions in the survey. They were all able to do so; one participant decided to use Spanish as an L1 in the second set of flashcards, given that she had moderate command of Spanish and English was her first language. However, one of the participants' L1 was not supported in the websites; for instance, Cram and Quizlet offered virtual keyboards in a limited number of languages, while StudyStack did not offer any.

Participants were able to add pictures to their flashcards on Cram and Quizlet, but were not able to do so in StudyStack because it did not have that option. They commented on this matter in the interview, reflecting on the relevance of the pictures and the time it took for them to load:

- **Amira:** "...it was easier [on Quizlet] than Cram to put in pictures, also. Because there were different options in which you put in the pictures."
- **Bethany:** "It was much easier, yeah."
- **Sarah:** "And the pictures you can add on Quizlet, like they're more relevant. Whereas in Cram, I typed 'doctor', and there was literally not a single picture of a doctor."
- **Amira:** "I was like trying to find 'artist', and it was the same."
- **Bethany:** "Yeah where does it look [for pictures]? And you don't know where those images are coming from... Are they just pre-loaded, or does it search the web?"
- **Sarah:** "And [the pictures] take like some time to load, as well. If you are navigating between pages to look at different pictures, it takes some time."

Figure 3. Participants' agreement with statements regarding the discoverability and design of websites

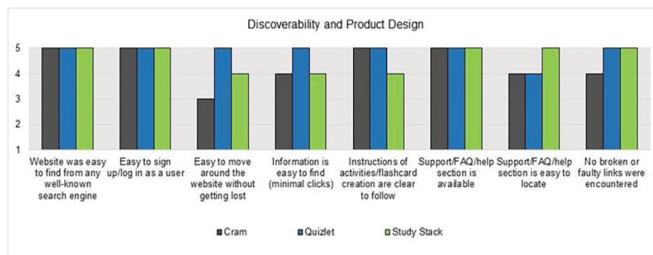


Figure 3 Participants' Agreement with Statements Regarding the Discoverability and Design of Websites

Figure 4. Participants' agreement with statements regarding technical usability of the websites

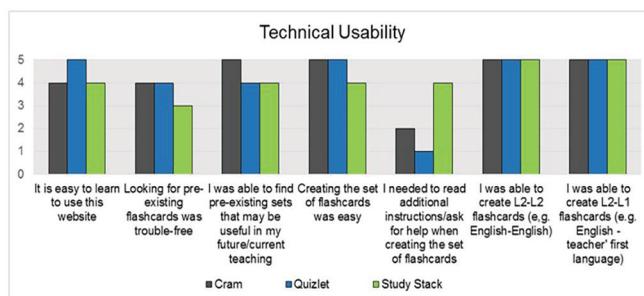


Figure 4 Participants' Agreement with Statements Regarding Technical Usability of the Websites

Hence, although the quantity of pictures was more on Cram, participants preferred the images on Quizlet because they were more relevant. All the three websites incorporate audio, in which the terms and/or the definitions are pronounced; however, participants pointed out in the interview that they found the option of recording one's own voice on Quizlet more advantageous than automated pronunciation.

Thus, in terms of technical usability of the websites, some patterns emerged. First, they ranked the websites according to how they personally perceived their technical usability to be. The in-service teachers' ranking was compared with Chien's (2015) study, where the EFL learners he surveyed liked "Quizlet the most and StudyStack the least" (p. 119). This was reiterated by three of the participants. Although the remaining two participants reported Quizlet as their first choice, Cram was their least preferred website as they felt it "was not as good as Quizlet".

As seen in the results of the survey, the screen layout and product design was an important factor in shaping the participants' attitude towards the technical usability of the digital flashcards. For instance, they repeatedly referred to the design features of StudyStack as displeasing and "old-fashioned" in the interview. Therefore, it could be determined that the "misaffordances" of StudyStack was its presentational scheme, as it "distract[ed] from the object's intended use" (Beatty, 2010, p. 243). This may be due to the "wow" factor, as it was the participants' first encounter with the website; Murray and Barnes (1998) assert that design features may largely contribute to developing the wow factor, engendering "a mixture of reactions upon initial exposure" (p. 258). The wow factor might have obscured teachers' objective view with regards to how StudyStack may be beneficial to their learners.

Secondly, participants found some features on specific websites to be particularly useful, which increased their technical usability, in their view. For example, there was an instructional video on StudyStack only. The video was viewed by two participants, Bethany and Dana, who acknowledged that it was both clear and had helped them in navigating the website. They stated that it could be one of the contributing reasons they felt that StudyStack is more useful than Cram. Another feature, reported by all the participants, was the voice recording option in Quizlet that was absent in the other two websites.

Thirdly, the participants' lack of agreement regarding the amount of instructions available for users on each website, particularly in StudyStack, may most likely be based on their personal preferences. This was because they did not refer to the students when considering this feature. It could possibly imply that the operational description of a website and teachers' own preferences (teacher fit) may have more significance than learner fit in formulating teachers' perceptions regarding the technical usability of digital flashcards.

Pedagogical Usability

To have a better idea of the participants experience with online vocabulary tools, they were asked to choose the tools they have used as students and teachers in the survey. Four out of the five participants indicated that they had used online vocabulary tools both as learners and teachers, with dictionaries and thesauruses as the most used tools. Three participants used digital flashcard websites as students, but only one participant used them as a teacher.

All the participants agreed that the three websites add value to vocabulary teaching and learning, encourage learners to both learn and practice vocabulary, and encourage learners' autonomy in the survey (Figure 5). Learners' autonomy was also highly emphasized by all participants throughout the interview. Even though participants commented that the websites did encourage autonomy, they still wanted to maintain teachers' control by, for instance, deciding which sets of flashcards their learners should view or use for vocabulary practice.

In the interview, participants expressed that Quizlet was more favorable because "it seemed like the most teacher- and learner-centered" and enabled them to have more "control" on the learners. In addition, it seemed more "credible", as one participant elaborated:

Figure 5. Participants' agreement with statements regarding pedagogical usability of the websites

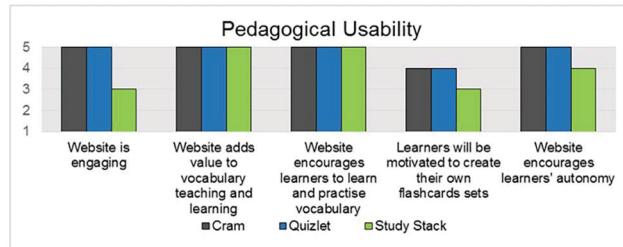


Figure 5 Participants' Agreement with Statements Regarding Pedagogical Usability of the Websites

[Quizlet] gives you quite a lot of information about how it's supposed to be used and how it helps you learn, and some kind of theories behind it. I mean it could be some pseudoscience, it could be nonsense, but it kind of made sense to me as a teacher.

When asked about feedback, Bethany's comment was illuminative, as she pointed out that using flashcards is a "small" but essential part of vocabulary teaching and learning.

- **Bethany:** "I think we've come to expect some kind of feedback, so it would be odd not to have it. I think it was sufficient, I mean I don't know... You can only get it right or wrong, can't you? So that's the only kind of feedback you can have is right or wrong."
- **PI:** "Do you think it is limited in a way?"
- **Bethany:** "Just by the nature of what it is, it's just learning the meanings of words, it's not like testing communicative competence, or anything more sort of advanced. So, I think it does what it says on the tin. I think it tests what I think it tests. But, like we said, it's just a small part of language learning. An important part."

In the interview, participants commented on how their students' age, gender, motivation, and learner-friendliness of the websites may play a role on the usability of digital flashcards. The "gamification" of the flashcards was cited as a potential source of motivation for the participants' future students. Furthermore, the three websites had a range of games in addition to flashcard creation. The games were extensively discussed in the interview; participants liked the number of games on StudyStack, as it had the largest range, but expressed that the graphics were old-fashioned nonetheless.

A prevalent theme throughout the interview was the age of the participants' prospective students. For instance, Dana mentioned that she felt StudyStack had potential, especially as she taught young learners, ages 6-10, and they may like the games on the website. However, she insisted that not having the option of adding pictures onto the flashcards was inconvenient. Bethany, Dana, and Evyavan felt that generally, digital flashcards will be more suitable to high school and college students as they are more likely to have computer skills. Another theme focused on the gender of the learners; it was considered to play "...a very important role in the creation of flashcards" by Amira. This was supported by other participants, and Amira clarified that one advantage of using digital flashcards, as opposed to paper-based flashcards, is that they were gender-neutral.

The participants unanimously expressed that Quizlet was more "learner-friendly" than the other two websites. When asked how the learners in their contexts may react to digital flashcards, they agreed that they will have a "mixed" reaction. Sarah and Dana had contradictory expectations, where Dana deliberated that learners will be happy "maybe at the beginning, and by time, they might not be as excited". On the other hand, Sarah reflected on her experience as a learner using digital flashcards, elaborating:

It might be the other way around, because when our lecturer introduced it I was like, 'What is this? This is dumb'. Seriously, what is the point of this? After a couple of weeks, when we saw that having such a big number of terminology which we needed to know... Like, oh wow. Now, I see its value.

Both the BOS survey and focus group interview yielded participants' opinions regarding the use of flashcards as a strategy for teaching and learning vocabulary in their future practice. Although they said they were willing to do so, most expressed reluctance when asked if they were willing to train their learners in using digital flashcards. Sarah was adamant, asserting "Honestly, if it requires training, I won't use it". She described her prior experience with training third-grade ESL students in using a specific program for written word form, Spellodrome. Even though her students had to use it once weekly for ten consecutive weeks, she felt she had to repeat training them because "...they still don't get it". However, two participants rationalized that Quizlet was easy to use, suggesting that students will "get the hang of it" if they explored the website in their own time.

Participants were urged to specify how they were going to approach learner training, and they specified:

- **Bethany:** "I think you can give them an introductory, very brief session, in class. You show them, and let them do it, and then you as a teacher be prepared for having their questions. As long as you are prepared to deal with it, the repercussions of it, then it's ok."
- **PI:** "So you're not willing to spend a lot of time?"
- **Amira:** "Not a lot of time."
- **Evyavan:** "No, not a lot of time. Just introduction, and let them work on it at home."
- **Bethany:** "And bit by bit in the classroom."

One participant expressed that the process of integrating digital flashcards in the classroom should be guided, explaining:

I think that's the key with any of these tools. If you're really going to commit to using them, you kind of have to have a plan, like I am going to train them bit by bit and then gradually [it] become[s a] normal part of lessons. So when I ask somebody to make five flashcards, my aim is that eventually it won't be a big deal."

Another participant put forward the idea of giving each learner the responsibility of creating a certain number of flashcards to combine them in one set that the class will have access to for reference. The others supported this, hypothesizing that it will motivate learners to make flashcards as detailed as possible. Participants also suggested to extend the collaborative effort between learners outside the classroom, where they can help each other in an attempt to reduce the training task on the part of teachers.

Therefore, in terms of pedagogical usability, the participants asserted that learning using flashcards was a "small but essential" part of vocabulary learning, even though they all had previously agreed that the three websites added value to vocabulary teaching and learning in the survey and discussion. Participants also indicated that although learning vocabulary through digital flashcards is beneficial and convenient, teachers should still use a range of vocabulary teaching and learning strategies as opposed to focusing only on one strategy. This reflects the literature reviewed, as experts such as Nation (2013) and Schmitt (2008) recommend that a well-designed vocabulary program should have a balance between incidental and deliberate learning.

Participants concurred that the digital flashcard websites they explored will motivate their learners. This was one of the Chien's (2015) conclusions, as he mentioned that digital flashcards motivated the learners he surveyed to learn more vocabulary. The perceived level of engagement of

participants' potential learners seemed of high importance, as teachers generally want to ensure that learning is both effective and efficient. Thus, this reflects the necessity to evaluate both the technical and pedagogical usability of any CAVL tool prior to using it in the classroom, given that learners may choose to reject using a tool based on their level of engagement.

What are the Factors that Affect In-Service Teachers' Perceptions of Digital Flashcard Websites?

A prevalent factor that was repeated throughout the interview was students' age. Participants noted that a lot of instructional decisions and choice of materials was linked to this factor, as they reflected on their teaching experiences and contexts. This may have influenced how the participants viewed the websites, as they placed higher emphasis on the quality of the graphics on both the flashcards and the accompanying games. Participants argued that learners nowadays are used to high-quality graphics and anything less would not engage them, possibly affecting their progress in vocabulary learning.

Prior experience with CAVL tools constituted as an important factor that affected how participants looked at the usability of the websites. For instance, participants' prior experience with Quizlet specifically may have influenced their positive intake of the website in comparison to Cram and StudyStack. Most of the participants reflected that they want to incorporate digital flashcard websites the way their own lecturer used Quizlet in a course on their MA program, mentioning "... we like it very much. We've seen it used successfully" and "I would use them like [our lecturer] did". The positive impact which resulted from using digital flashcards in their own learning influenced the level of their acceptance of using them as a tool in their future teaching. Surprisingly, Amira, who did not use CAVL tools either as a learner or teacher in the classroom was more positive towards them. This could be because of the "wow" factor, as her positive reaction and enthusiasm may be due to initial exposure.

An additional factor that must be taken into consideration is accessibility, particularly if digital flashcards are to be incorporated inside the classroom. The participants emphasized that their schools or educational institutions may not have Internet or computers in three of the four contexts. Therefore, it can be concluded that the digital divide is still a prevalent issue in many countries. Poor Internet access was also reported by Chien (2015) as a problem that language teachers may face when incorporating any kind of technology in vocabulary instruction. Even if the websites have smartphone apps, many educational settings do not permit students to use their mobile phones. This reduces the likelihood of integrating digital flashcards inside the classroom.

Will In-Service Teachers Integrate Digital Flashcard Websites in their Future Practice?

As discussed so far, teachers' personal preferences, prior learning experience, teaching experience, and access to resources were all factors that possibly affected in-service teachers' perception regarding digital flashcards. Still, it is perhaps difficult to formulate a conclusive answer with regards to the third research question as the participants established in the interview that it would predominantly all depend on their teaching context and learners' age. Therefore, it may be more useful to determine the likelihood of teachers integrating digital flashcards in their practice once they are certain of their teaching context.

Even though the teachers were not opposed to integrating using flashcards as a strategy, they were hesitant towards learner training in digital flashcards as a CAVL tool. Four of the participants answered "probably" when they were directly asked whether they were going to use digital flashcards in their future practice. Their hesitance to commit themselves by indicating agreement or willingness to apply this strategy may likely be because it would depend on their learners and their needs, which is one of the aspects Nation (2013) advises teachers to focus on when developing vocabulary programs. One participant replied that she will only utilize this strategy "If [she is] not teaching young learners", and her response may have stemmed from her unsuccessful prior experience with training third graders.

The teachers were willing to incorporate digital flashcards outside the classroom as supplementary to in-class instruction, by encouraging learners to use digital flashcard websites in their own time. Yet, Chien (2015) believes that time should be made available in class for learners to participate in computer-assisted language learning. However, time in school is limited; and therefore, using digital flashcards outside the classroom may offer learners a better opportunity to fully explore the websites without limiting themselves to classroom time.

The participants suggested to make the flashcard strategy a collaborative activity between learners. Interestingly, the collaborative learning potential was advocated by Hung (2015), as he found that the attitudes of 75 EFL learners he surveyed were more positive and more accepting towards group-based format digital flashcard learning using StudyStack than in self-practice or peer-exchange formats.

LIMITATIONS

There were several limitations in this study; for instance, due to feasibility issues sampling criteria, only five in-service teachers were included. Findings cannot be generalized due to the small sample size. It would be useful to include a larger sample of teachers from additional contexts in future studies to provide a better wide-ranging overview of their perceptions. Furthermore, as a result of the time constraints that both the participants and principal investigator of the study had, it was more convenient to recruit the participants in a one-off basis session to explore the websites. This may have played a role in fostering the “wow” factor in their perception towards the websites. Therefore, a longitudinal study, in which the participants explore the websites several times and the investigators could possibly obtain their responses at different phases of the study, would offer a more comprehensive view of their perceptions. Additionally, although in-service teachers’ perceptions towards digital flashcards were examined to determine the likelihood integrating this CAVL tool in their future teaching, it can only be verified once they re-enter the teaching field. If they do incorporate digital flashcard websites, it would be of high value to ascertain if their perceptions towards them change or remain the same.

IMPLICATIONS

Based on this study, there are several implications for researchers, teachers, and teacher trainers. Implications for learners have been excluded because previous studies, such as Chien (2015) and Hung (2015), concentrated on them and they were not the focus of this study.

First, it may be of high interest to researchers to track and compare how similarly or differently users approach digital flashcard websites. It could help them determine the relationship between how a website is approached and how the user perceives it. For instance, in this study, the participants’ approach towards exploring the websites differed; some preferred to view an instructional video, while other dismissed it. This could have possibly affected the way they perceived the websites, which was exemplified when those who viewed the video on StudyStack had a more positive attitude towards it than the other participants. Future studies can also empirically explore whether gender plays a role in digital flashcard creation and learning, as participants discussed the issue of gender in the interview.

Secondly, for teachers, training and flashcard creation can be a collaborative effort between them and their learners, as suggested by the participants in this study and previously recommended by Hung (2015). To facilitate integrating digital flashcards as a CAVL tool in the English language classroom, five guiding principles, proposed by Hubbard (2004), for learner training in CALL courseware implementation can be put into practice. Some of the principles were either implemented in this study or were suggested by the participants in some way. For instance, the first principle includes having the teachers experience the tool from the learner’s perspective, which was applied in this study when the participants had to explore the websites and create the sets of flashcards. The second principle includes giving learners some teacher training to help them work independently, make better decisions, and understand the link between the CAVL tool and learning objective. The

third principle was discussed by the participants, where they deliberated with either relying on a one-time training session or to make training an ongoing process. Hubbard (2004) suggests employing a “cyclical approach”, where training is continuous. The fourth principle includes using “collaborative debriefings” after using the tool to encourage students to collectively reflect on their learning process. The fifth principle includes teaching learners general exploitation strategies to increase their control of the tool. These principles may provide a useful framework for integrating digital flashcards in the classroom and help teachers train their learners in using this deliberate vocabulary learning strategy.

As the participants of this study were in-service teachers on an MA ELT program, there are some implications for universities and colleges engaged in teacher training. Potentially, attempting to integrate CALL or CAVL tools in several courses is more advantageous than focusing on CALL as a stand-alone course, particularly if teacher trainers focus on specific tools that would be useful to teachers both as university students and future practitioners. In this way, teachers will have a distinctive position in evaluating these tools by reflecting on their experience as students and considering them as possible tools to be integrated in their future practice. Having the dual role and combined experience can help teachers determine the usability of CAVL tools more comprehensively. This could also serve as an addition to Hubbard’s (2011) methodological framework for CALL evaluation, where the teacher-as-learner perspective is both highlighted and reflected on.

CONCLUSION

Five in-service teachers from four contexts were invited to explore three digital flashcard websites to examine their technical and pedagogical usability, and whether it will affect the likelihood of them integrating them in their practice. Studies such as Chien (2015), Hung (2015), McLean, Hogg, and Rush (2013) looked at the effectiveness of digital flashcards from the point of view of learners. Although the strategy was reported to be successful, learners still need to be trained in using digital flashcards as indicated in the previous studies. Teachers, therefore, need to establish the affordances of digital flashcards themselves, as they will decide whether they want to integrate them or not. One way to determine the affordances of digital flashcards is by looking at the usability of the websites dedicated to them.

There was a consensus between the participants with regards to the best example out of the three digital flashcard websites: Quizlet. However, their opinion was divided between Cram and StudyStack, with three participants favoring Cram over StudyStack while the other two preferred StudyStack. Regardless, participants believed that the added functions of digital flashcards are more beneficial than paper-based flashcards, even though, as one of the participants elaborated “flashcards are not a new idea... I think [them being online] improves them” (Focus Group, *ibid*).

Several factors could have affected their perceptions, including the screen layout and color scheme of the websites, the age and gender of their students, and the necessity of learner training. The in-service teachers were uncertain whether they will incorporate digital flashcards because they were reluctant to train learners. Regarding learner training, some participants preferred only offering an introductory session, while others wanted to divide training into smaller tasks, distributing them across several sessions. The latter approach is supported by Hubbard (2004, 2011). However, the lack of consensus between participants concerning the best approach to integrate a CAVL tool in their practice may potentially present a barrier to incorporating digital flashcards in their ELT, as they may abandon the idea altogether.

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