# Learning English Vocabulary using Web-Based Leitner Box with Social Network

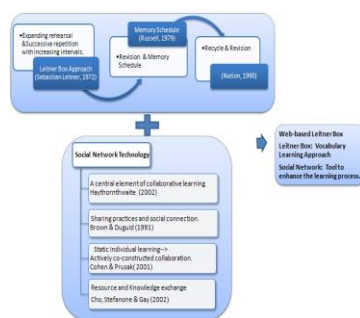Yunxia Gao, Zaidatun Tasir*, Jamalludin Harun, Nurul Farhana Jumaat

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## Graphical abstract



## Abstract

The aim of the research is to explore the impact of the web-based Leitner Box which is enhanced with social network, particularly Facebook on English vocabulary learning. This research used mixed research design and the data were collected both in qualitative and quantitative ways. The instruments include questionnaire, semi-structured interviews, and performance tests. 35 university's students were chosen randomly as the respondents for the questionnaire and 30 students from English class were chosen purposively to do the pre-test and post-test. From the findings, it is discovered that students agreed they have problems in learning vocabulary (mean = 3.98). The web-based Leitner Box has a significant positive impact on English vocabulary learning ($p < 0.05$). Findings from the questionnaires also revealed that students gave positive opinions toward web-based Leitner box (mean = 4.28). In term of whether the element of social network can be beneficial to students, the findings showed that social network helps students to learn English vocabulary in this collaborative learning environment (mean = 4.28). The students claimed that web-based Leitner Box and social network make the vocabulary learning process much easier and more interesting by sharing information and actively participating in the collaborative learning environment.

*Keywords*: English vocabulary; technology; social network; Facebook

## Abstrak

Kajian ini bertujuan untuk meninjau kesan daripada penggunaan sistem berasaskan web iaitu Leitner Box menerusi penggunaan rangkaian sosial iaitu Facebook dalam pembelajaran perbendaharaan kata Bahasa Inggeris. Kajian ini menggunakan reka bentuk penyelidikan campuran dan melibatkan data kualitatif dan data kuantitatif. Instrumen kajian ini terdiri daripada soal selidik, temu bual separa berstruktur dan ujian prestasi. 35 pelajar universiti telah dipilih secara rawak sebagai responden untuk soal selidik dan 30 orang pelajar dari kelas Bahasa Inggeris telah dipilih secara bertujuan untuk menjawab ujian pra dan pasca. Hasil kajian mendapati bahawa pelajar mempunyai masalah dalam pembelajaran perbendaharaan kata (min = 3.98). Penggunaan Leitner Box pula mempunyai kesan positif yang signifikan pada pembelajaran perbendaharaan kata Bahasa Inggeris ($p < 0.05$). Hasil daripada soal selidik juga menunjukkan bahawa pelajar memberikan pendapat yang positif ke arah penggunaan Leitner Box (min = 4.28). Dari aspek sama ada unsur rangkaian sosial boleh memberi manfaat kepada pelajar, hasil dapatan menunjukkan bahawa rangkaian sosial membantu pelajar untuk mempelajari perbendaharaan kata bahasa Inggeris dalam persekitaran pembelajaran kolaboratif (min = 4.28). Pelajar mendapati bahawa penggunaan Leitner Box dan rangkaian sosial membuatkan proses pembelajaran perbendaharaan kata lebih mudah dan lebih menarik dimana pelajar boleh berkongsi maklumat dan mengambil bahagian secara aktif dalam persekitaran pembelajaran kolaboratif.

## 1.0  INTRODUCTION

With rapid development of globalization in society and economy, many countries expand their communication with other countries in every field. Consequently, English, as the international language, has become a compulsory course in primary and secondary schools, also in universities of many non-English speaking countries. As mentioned by Song and Fox [1], learning English is important for university students in non-English speaking countries, especially for those who study in English-medium (EM) universities.

Vocabulary learning is essential in learning English because vocabulary is the basic component of English sentences [2]. Without adequate vocabulary, it is hard to be expert in reading, writing, speaking and listening. Many research findings show that many incorrect inferences and misunderstanding of the content while reading English materials in the academic studies are caused by poor vocabulary [2, 3, 4].

English contains almost the greatest number of words of any major language, which makes learning a sufficient amount of its vocabulary a very difficult task [5]. Second language learners with knowledge of the most frequent 10,000 word families in English can be considered to have a wide vocabulary. In addition Hazenburg and Hulstijn [6] found that a vocabulary of this magnitude may be required to cope with the challenges of university study in a second language. How well English is finally achieved in a certain degree depends on the learning of these vocabularies [7].

With the expectation of learning of wide and varied vocabularies of individual words, English learners have to learn how to handle a large number of multiword units [8, 9, 10]. English has a great number of these multiple-word-item lexemes that are used as a whole part with a single meaning (e.g. pass away, bite the dust, kick the bucket, and give up the ghost are all have the same meaning to die). There are a number of different kinds of multiword units, including compound words (classroom), phrasal verbs (give up), fixed phrases (ladies and gentlemen), idioms (put your nose to the grindstone),and proverbs (the early bird catches the worm). Although it is certainly possible to be communicative without using these multiword units, they are a large part of what makes proficient English speakers sound natural [5].

It is surprising, however, the fact is that relatively little attention is paid to the problem of vocabulary acquisition in the foreign language classroom. Many teachers leave the problem to the student as homework, and little instruction is given regarding effective acquisition techniques. Teachers seldom give much class time to teaching individual words, because even though you spend a lot of valuable time on teaching vocabulary, it does not make much difference in the point view of result. It depends on paper-based resources and students can learn it by making use of abundant time after class [11].

Another big problem of vocabulary learning is that learners may forget the vocabulary easily without revision and usage after a long time. Based on the Norbert Schmitt's theory, the vocabulary learned through incidental learning must be met and used multiple times in order to be mastered eventually. He emphasizes more on recycle, revision and memory due to the typical pattern of forgetting which is illustrated in his book [12]. Even though it is certainly possible to learn thousands of words through explicit memorization, however, students may find these methods tedious and discouraging [13].  Therefore research into vocabulary learning for English learners has been prominent and necessary.

Many English learning experts and researchers put forward their theories and research results of learning English vocabulary constantly, such as the use of h-flash cards to help students learn biology [14], using blog-based online journals for improving English learners' writing skill [15] and using Personal Digital Assistants (PDAs) to enhance students' incidental vocabulary learning [1].

Another popular method to learn English vocabulary is by using flashcards. In 1972, Sebastian Leitner publishes "So lernt man lernen" in which he describes his Leitner card box. The Leitner card file technique can be considered as a precursor of spaced repetition. In her Wordforms, Gordon [16] also emphasized the importance of learning English vocabulary by using flashcards. The efficiency of such methods with respect to retention is hard to deny [2].

Learning is a social process, even though it seems like an individual accomplishment. Nowadays, under the great influence of information and communication technology, this learning process has been accelerated. People can learn more than before from the network of peers, friends, colleagues and even family [17].

Since the demand of collaboration grows, we need tools which can connect us in social networks and support the creation of online communities [18]. Online communication provides more opportunities for groups of people who share similar interests to discuss any interesting issues, to ask questions and to share different perspectives or knowledge with each other through the network [19, 20]. Not only the individual's learning can be promoted, but also the advancing of

group's collective knowledge through actively sharing ideas with others is also supported by online social communities [17].

In order to face the challenges of education in 21st century and to provide English learners an online self-educated learning environment, this research has developed a website based on the theory of Leitner Box enhanced by social network in order to help English learner to learn English vocabulary. The main theory of this approach is vocabulary acquisition through expanding rehearsal in which successive repetitions occurs in increasing intervals. It can be considered as a precursor of spaced repetition. This theory is supported by Russell [21] and Nation [22]. In Russell's theory, learners should review what they have learned after 5-10 minutes of their study period, 24 hours later, one week later, one month later, and finally six months later according to the memory schedule. Nation [22] also emphasized on recycle repetition. In his opinion, learners must recycle the vocabulary in order to finally master them. The following Figure 1 shows the theoretical framework.
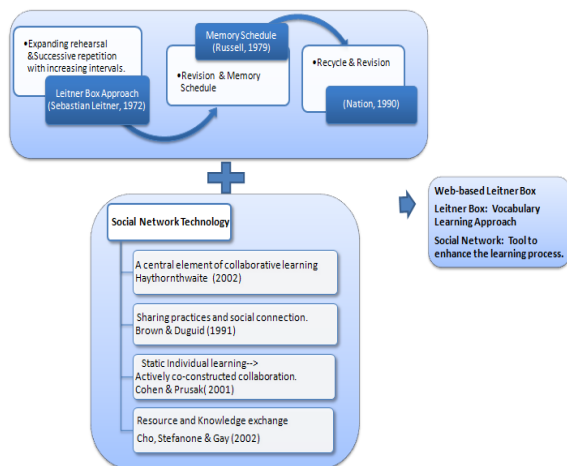


**Figure 1** Theoretical framework

The benefits of social network are prominent and accepted by most of the researchers. Social network is considered as central element in collaborative learning environment. In this learning environment, learners are not static individuals but actively co-constructed among multiple learners. Learners share their information with other learners in the same field. Through this knowledge exchange process, learners can get knowledge from a wider scope [23]. Another fact of the social network is that learners can get more motivation from each other through both competition and cooperation.

The purpose of this study is to explore the impact of web-based Leitner Box on English vocabulary learning. Specifically, this study intends to achieve the following objectives:

1. To investigate students' opinions towards English vocabulary learning.

2. To develop a website and offer the possibility of using the web-based Leitner Box combined with social network technology to learn English vocabulary.
3. To identify how students learn vocabulary through the website.
4. To explore the impact of the web-based Leitner Box on English vocabulary learning.
5. To explore the functions of social network in online English vocabulary learning.

## 2.0 RESEARCH METHOD

Based on the objectives and research questions of this study, data were gathered by using both qualitative and quantitative methods. Qualitative data had been collected through semi-interviews to get students' perceptions and reflections. At the same time, quantitative data had been collected from a vocabulary test and a questionnaire.

A number of 35 English preparation class students from one of the Malaysian universities were randomly selected to answer the questionnaire to investigate students' opinions towards English vocabulary learning. Then, a web-based Leitner Box had been developed and some social network technologies had also been added to the website. When the website was ready, those 35 students were invited to use the online Leitner Box to learn English vocabulary.

After using Leitner Box for one month, students were asked to answer a questionnaire, which contains questions focusing on their personal learning experience, learning progress, opinion on Leitner Box and social network. Through this questionnaire, more details about the process and result were discovered. At the same time, 30 students from two classes of English preparation class had been chosen to do the performance tests. This whole implementation procedure of this study was conducted in six weeks. In the first week, 30 students were invited to do the pre-test to get basic information of students' English vocabulary level.

Then, from week 2 to week 5, 15 students from class A were asked to use the web-based Leitner Box in their English vocabulary learning. Meanwhile, another 15 students from class B continued their vocabulary learning without using the web-based Leitner Box. After one month, in the final week, another post-test was given to all 30 students so that the results could be compared later.

The different results of pre-test and the post-test had been further analyzed. At the same time, the semi-structured interviews were conducted in order to find out students' perspectives about using web-based Leitner Box to learn English vocabulary. The data collected from this process have been analyzed by using both quantitative and qualitative analysis methods. The research instruments used in the study consist of English vocabulary test, questionnaire, observation and semi-structured interviews. Thus, data

had been collected from both quantitative and qualitative methods.

English vocabulary tests consist of two parts containing two different types of questions. The first part was made up of 10 multiple choice questions which test Synonyms in order to test students' understanding on English vocabulary. The second part of questions was designed for students to guess the meaning of the underlined words in the given reading paragraph, which was helpful to test students' ability of using words in context. Five questions had been included in this part. All of these 15 questions had been designed by the researcher based on the special focus of this study. In order to maintain the consistency of the test, the pre-test was similar to the post-test both in form and difficulty level.

The second method of data collecting was through the use of semi-structured interview. Compared to the structured interview and open-ended interview, this kind of interview gave students some freedom to express their views but still be guided by the interviewer. Since semi-structured interview is a half-open interview, some prepared questions are necessary and helpful to make sure that the interview process could be conducted smoothly and successfully. In this study, five questions were given to interviewees. The questions had been designed with emphasize on the functions of social network such as: "Does the social network really help you in your learning process?" "How does the social network technology help you during learning?" "Does it make your learning process more interesting?" "Do you get more motivation through collaborative learning?"

The third instrument used in this research is an online questionnaire. The use of questionnaire is to find out students' perspective on the web-based Leitner Box as a medium of English vocabulary learning. This questionnaire consists of 22 questions and covers four parts: Part A, Part B, Part C and Part D. The questions in Part A discusses the personal details of students such as: their problems in learning English vocabulary, their personal learning experience and even their levels etc. Part B contains the questions about details how they use the web-based Leitner Box, for example, how often they use the Leitner Box and how long they usually stay in the Leitner Box. Part C consists of questions that emphasize on the result such as the students' opinions and their progress. In Part D, the questions are about the functions of social network.

A five-point Likert Scale (Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree) has been used to help the students to specify their level of agreement, since the choices are clearly presented. The advantages of using the Likert scale is that multiple item scales provide more reliable or more consistent scores and they produce more variability, which helps the researcher to make finer distinction among the respondents [24].

In this research, a pilot study was carried out on 10 students who did not involve in the real study. The Cronbach's alphas were 0.703 for the scales of Part A: Personal learning experience, 0.807 for the scales of Part B: Learning details, 0.800 for the scales of Part C: Opinion of Leitner Box and 0.778 for the scales of Part D: The functions of social network. Based on the alpha values, it could be concluded that the questionnaire is reliable.

The duration of developing the web-based Leitner box lasted for three months. During this period, studying and developing were proceeded due to the continuously upcoming new ideas and problems. In order to explain the details of development, software and programming language used for this website were discussed.

Visual Studio (Microsoft Visual Studio 2010 Professional) was chosen as the programming environment for this website. Microsoft Visual Studio 2010 Professional is the essential tool for individual performing basic development tasks. It simplifies the creation, debugging, and deployment of applications on a variety of platforms including SharePoint and the Cloud. Visual Studio 2010 Professional comes with integrated support for test-driven development, as well as debugging tools that help ensure high-quality solutions. Besides Visual Studio, Hot Potatoes software was used to create online quiz for English Vocabulary.

During the development process, online questionnaire was created by using Google Document. After publishing the website, Google Analytics was used to show the user details in order to get a clear understanding of how users use this website.

Programming languages used for this website include; ASP.NET MVC 2, C# and SQL2008. The ASP.NET MVC 2 is installed and available in Visual Studio 2010. The Model-View-Controller (MVC) pattern is an architectural design principle that separates the components of a Web application. This separation gives more control over the individual parts of the application, which is more easily to develop, modify, and test them.

## 3.0  RESEARCH FINDINGS

### 3.1  Web-based Leitner Box

The development process of the web-based Leitner Box was based on ADDIE instructional design model. Analysis, Design, Develop, Implement and Evaluate (ADDIE) model is usually considered to be one of the most widely used systematic process models in instructional design community. ADDIE model provides a generic and systematic framework to the instructional design process that can be applied to any learning solutions [25]. This web-based Leitner Box was designed for all the English learners who have problems in English vocabulary learning.

For web-based Leitner Box, two main learning theories were adopted, one of which is Leitner Box Learning Theory, that emphasis Expanding Rehearsal and Successive Repetition with increasing intervals supported by the "Memory Schedule" theory put forward by Russell [21]and the " Recycle & Revision"

approach by Nation [22] The other main learning theory for this website is collaborative learning based on social network. This learning theory also get widely supported, such the idea of Resource and knowledge exchange [26], sharing practices and social connection [27]. Figure 2 to Figure 4 show the main interface of this website.



**Figure 2** Front page



**Figure 3** Word list



**Figure 4** Leitner box interface

### 3.2  Students' Opinion of English Vocabulary Learning

Table 1 shows us various opinions on English vocabulary learning from different learners. 60 percent of the subjects think learning English vocabulary is boring and time-consuming task. On the contrary, about 31 percent of the subjects show different opinions; where1/3 of the subjects enjoy studying English vocabulary. When asked whether they have problems in remembering large number of vocabulary, the number of disagree reduced tremendously to 14 percent, and more than 71percent of them claimed that they have problems. In addition, more than 85 percent of the subjects mentioned that they were not satisfied with their current way of learning.

For the way of learning, more than 97 percent of them agreed that they need to review the new words again at the proper time in order to totally master them, and 80percent of them believed it is better to learn large number of vocabulary with friends.

### 3.3  How Students Learn Vocabulary through the Web-based Leitner Box?

This web-based Leitner Box was created with many functions. Firstly it was created with special arithmetic

**Table 1** Students' opinion of english vocabulary learning

| Part A Personal Learning Experience | Strongly Disagree | | Disagree | | Neutral | | Agree | | Strongly Agree | | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % | |
| 1. Learning English vocabulary is a boring and time-consuming task. | 7 | 20.00 | 4 | 11.40 | 3 | 8.57 | 13 | 37.10 | 8 | 22.90 | 3.31 |
| 2. I have some problems in remembering large number of English vocabulary. | 2 | 5.70 | 3 | 8.60 | 5 | 14.30 | 12 | 34.30 | 13 | 37.10 | 3.89 |
| 3. I am not satisfied with my current way of learning and want to find a more efficient way to learn English vocabulary. | 0 | 0.00 | 1 | 2.90 | 4 | 11.40 | 20 | 57.10 | 10 | 28.60 | 4.11 |
| 4. In order to master some new words, I need to review it again at proper time. | 0 | 0.00 | 0 | 0.00 | 1 | 2.90 | 17 | 48.60 | 17 | 48.60 | 4.46 |
| 5. It is a better way to learn English vocabulary with someone else together. | 0 | 0.00 | 3 | 8.60 | 4 | 11.40 | 14 | 40.00 | 14 | 40.00 | 4.11 |
| **Overall Mean** | | | | | | | | | | | **3.98** |

N= 35

repetitive schedule for interval reviews of the words in users' Leitner Box according to Sebastian Leitner's (1972) original idea. Besides, this website also added many functions for online learning. More than two hundreds of words were entered into the Word List for learners to get started. By using Content List, learners can share good articles and videos with each other. A series of online quizzes were created and inserted to this website for learner to conduct self-checked learning. At the same time, some social network functions were also adapted to this website, which will be discussed later.

From the data showed in Table 2, we can see 80 percent of the students thought they should check their Leitner Box every day, and more than 97 percent of them review the words in their Leitner Box whenever they use the website. When researcher asked about checking the words or content (good articles and videos) shared by other learners, even though 14 percent of them kept neutral, more than 85% of the subjects said they checked the words shared by other learners, and 77 percent of them showed they checked the content uploaded by others. For online quizzes, 71 percent of them showed their preference, but at the same time, more than 11 percent of them said they did not do the self-test frequently and 17 percent did not show their opinion prominently.

Meanwhile, Google Analytics was also used to show the details of website usage. According to the report, the page views were up to 4581 pages during the month when the research was conducted. The maximum visit for a day was 385 pages (Friday, October 1, 2010).

Table 3 shows the usage details of several main pages of this website. In sum, there were 404 pages visited by the learners on several main pages of the website throughout the research period. From table 3, it can be concluded that most students used web-based Leitner Box in learning vocabulary by browsing students' Leitner Box, participating in forums and quizzes and creating definition for the words.

### 3.4 The Impact of Web-based Leitner Box on English Vocabulary Learning

From the responses gathered in Table 4, 97 percent thought that it is a good idea that the web-based Leitner Box could automatically remind learners to review the words. For this online collaborative learning environment, more than 71 percent said they got benefits from the information shared by others. 100 percent agreed that the web-based Leitner Box is useful in their vocabulary learning process and it makes their learning much easier and interesting than before. Also 100 percent claimed that by using the web-based Leitner Box, they have increased their vocabulary. Compared with paper and pen, 80 percent showed their preference to the online Leitner

**Table 2** Learning details of the web-based leitner box

| Part B: Learning Details of Web-based Leitner Box | Strongly Disagree | | Disagree | | Neutral | | Agree | | Strongly Agree | | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % | |
| 6. I should check my Leitner box every day. | 0 | 0.00 | 0 | 0.00 | 7 | 20.00 | 21 | 60.00 | 7 | 20.00 | 4.00 |
| 7. I review these words that Leitner box reminds me whenever I go to the website. | 0 | 0.00 | 0 | 0.00 | 1 | 2.90 | 22 | 62.90 | 12 | 34.30 | 4.31 |
| 8. I check the words other people shared online. | 0 | 0.00 | 0 | 0.00 | 5 | 14.30 | 22 | 62.90 | 8 | 22.90 | 4.09 |
| 9. I read the articles and videos shared by other learners. | 1 | 2.90 | 2 | 5.70 | 5 | 14.30 | 19 | 54.30 | 8 | 22.90 | 3.89 |
| 10. I do the words quiz to test myself frequently. | 1 | 2.90 | 3 | 8.60 | 6 | 17.10 | 17 | 48.60 | 8 | 22.90 | 3.80 |
| Overall Mean | | | | | | | | | | | 4.02 |

N=35

**Table 3** Usage details of this Website

| | Page | Page views | Avg. Time on Page |
|---|---|---|---|
| 1. | Home Page (after login) | 842 | 00:01:07 |
| 2. | Words list | 295 | 00:00:19 |
| 3. | Student Leinter Box | 231 | 00:00:54 |
| 4. | Register Page | 134 | 00:01:47 |
| 5. | Forum | 121 | 00:00:42 |
| 6. | Quizzes | 116 | 00:01:30 |
| 7. | Words/Page/1 | 111 | 00:00:10 |
| 8. | Definition/ create | 82 | 00:00:35 |
| 9. | Contents | 70 | 00:00:16 |

Box, and more than 94 percent students will continue to use Leitner Box to learn English vocabulary in the future.

In order to identify the influence of this web-based Leitner Box which enhanced with social network on the English vocabulary learning, pre-test and post-test were distributed to 30 students (15 students in Class A and 15 students in Class B). A Mann-Whitney U Test was used to compare differences of post-test between class A and class B. Table 5 shows mean rank and sum of ranks for the two groups tested (Group A and Group B).

Table 6 shows us the actual significance value of the test. From this data it can be concluded that there is a statistically significant difference between the post test of class A which used web-based Leitner Box and post

test of class B which did not use the website at the end of both treatments ($p <0.05$). It can be further concluded that the web-based Leitner Box has significant positive impact on English vocabulary learning.

### 3.5 Students' Perception on the Social Network Function

This web-based Leitner Box is enhanced by some social network functions in purpose of creating a collaborative learning environment online; thus learners not only learn by themselves but also learn from each other. Based on the information in Table 7, more than 91 percent of the learners shared new words with each other. They learned some new words from other learners and also uploaded some new words to the website to share.

About the satisfaction of collaborative learning environment, 97 percent claimed that they enjoyed a lot from this online learning environment and social network functions motivated them to go and check their Leitner Box frequently. Lastly, 100 percent of the users would like to recommend this website to their friends.

## 4.0 DISCUSSION

Based on the findings of this research, the overall mean of students' opinion toward the problem of learning English vocabulary is 3.98 (Refer Table 2). Based on the mean, it can be concluded that students agreed on most of the questions related to their opinion on learning vocabulary.

**Table 4** Learners' Opinion of Web-based Leitner Box

| Part C: Learners' Opinion | Strongly Disagree | | Disagree | | Neutral | | Agree | | Strongly Agree | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % | Mean |
| 11. It is a better idea to remind me which word to review automatically when I go to the web-based Leitner box. | 0 | 0.00 | 1 | 2.90 | 0 | 0.00 | 21 | 60.00 | 13 | 37.10 | 4.31 |
| 12. I can understand the meaning of a new word better by the information shared by others. | 1 | 2.90 | 2 | 5.70 | 7 | 20.00 | 15 | 42.90 | 10 | 28.60 | 3.89 |
| 13. By using the web-based Leitner box, I have increased my vocabulary. | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 21 | 60.00 | 14 | 40.00 | 4.40 |
| 14. The web-based Leitner box makes my vocabulary learning much easier and more interesting than before. | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 22 | 62.90 | 13 | 37.10 | 4.37 |
| 15. The Leitner box is helpful in my vocabulary learning process. | 0 | 0.00 | 0 | 0.00 | 0 | 0.00% | 16 | 45.70 | 19 | 54.30 | 4.54 |
| 16. Compared with the pen and books, I prefer the web-based Leitner box. | 1 | 29.00 | 1 | 29.00 | 5 | 14.30 | 17 | 48.60 | 11 | 31.40 | 4.03 |
| 17. I will continue to use the web-based Leitner box to learn my vocabulary. | 0 | 0.00 | 0 | 0.00 | 2 | 5.70 | 17 | 48.60 | 16 | 45.70 | 4.40 |
| Overall Mean | | | | | | | | | | | 4.28 |

N= 35

**Table 5** Mean ranks of two groups

| | Group | N | Mean Rank | Sum of Ranks |
|---|---|---|---|---|
| posttest score | Group A | 15 | 22.07 | 331.00 |
| | Group B | 15 | 8.93 | 134.00 |
| | Total | 30 | | |

**Table 6** Mann-whitney test statistics

| | posttest score |
|---|---|
| Mann-Whitney U | 14.000 |
| Wilcoxon W | 134.000 |
| Z | -4.113 |
| Asymp. Sig. (2-tailed) | .000 |
| Exact Sig. [2*(1-tailed Sig.)] | .000a |

a. Not corrected for ties.

b. Grouping Variable: Group

For the satisfaction of their current way of learning vocabulary, more than 85 percent of the learners were not satisfied with their current way of learning where the mean is 4.11. This reflected that the students face problem in learning English vocabulary, which is however not surprisingly a new issue among students who learn English. According to [5], English even contain many words from many other languages, so it makes English vocabulary learning a formidable task. Nation and Meara [6] also shared similar opinion; they stated that learning large number of vocabularies almost becomes key constraint in process of mastering English.

About the way of learning, students shows their agreement that they need to review the new words at the proper time in order to master the words (Mean=4.46). This result is consistent with many previous researches such as Russal's Memory Schedule (1979) and Nation's Recycle and Revision (1990). In term of their opinions on learning together with other friends, the mean is high (4.11) and this shows that students believe it is a good way to learn with other learners.

During this research, the students were asked to use web-based Leitner Box to learn English vocabulary for one month. About three hundreds of English words were inserted and provided to them, and at the same time, they have the freedom to input the words they are interested to learn into their Leitner Box. Online quizzes are also provided so that they can evaluate themselves at anytime they want.

Table 2 and Table 3 show the details on how learners used this website for their English vocabulary study. Students acclaimed that they checked their Leitner Box every day (Mean=4.00) and they reviewed words recommended by the Leitner Box whenever they went

to the website (Mean=4.31). It has been proved to be important and necessary in vocabulary learning.

The problem of learning English vocabulary is not only due to the large number of words that the learners need to master, but also because they are easy to forget without review. As Nation [2] said, due to vocabulary is the basic component of English sentences, the vocabulary learning plays a very important role in the whole English learning process. No matter it is intentional learning or incidental learning; English learners should pay attention to recycling, revision and memory [5].

Web-based Leitner Box is based on the Leitner Box's Algorithm theory. The Leitner Box techniques can be considered a precursor of spaced repetition, which is highly affected by the intensity of learning, the

**Table 7** The functions of social network

| Part D: the Functions of Social Network | Strongly Disagree | | Disagree | | Neutral | | Agree | | Strongly Agree | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % | Mean |
| 18. I learn some new words from other learners who also use Leitner box. | 0 | 0.00 | 0 | 0.00 | 3 | 8.60 | 26 | 74.30 | 6 | 17.10 | 4.09 |
| 19. I shared new words with other people online. | 0 | 0.00 | 0 | 0.00 | 3 | 8.60 | 23 | 65.70 | 9 | 25.70 | 4.17 |
| 20. I enjoy a lot from the online collaborative learning environment. | 0 | 0.00 | 1 | 2.90 | 0 | 0.00 | 22 | 62.90 | 12 | 34.30 | 4.29 |
| 21. This collaborative learning environment motivates me to go and check my Leitner box frequently. | 0 | 0.00 | 0 | 0.00 | 2 | 5.70 | 20 | 57.10 | 13 | 37.10 | 4.31 |
| 22. I will recommend this website to my friends who also want to improve their English vocabulary. | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 16 | 45.70 | 19 | 54.30 | 4.54 |
| **Overall Mean** | | | | | | | | | | | **4.28** |

N=35

technique points to the benefits of expanding rehearsal in which successive repetitions occur in increasing intervals (Sebastian Leitner, 1972). Basically, web-based Leitner Box is consistent with Schmitt's "revision and memory" theory.

As shown in Table 2, students also agreed that they checked the words, article and video shared by other learners. The means are 4.09 and 3.89 respectively. Furthermore most of the students stated that they did the online quizzes frequently to test themselves (Mean=3.80). According to Brown and Duguid [27], learning is a social and collective outcome achieved through seamless conversations, shared practices, and networks of social connections. When asked how to learn vocabulary through this website, students used the following learning process:

1. Adding new words and new definitions and doing the quizzes of the website.
2. Sharing new ideas with peers

Following are example of student 1 and student 2s' responses to questions related on how they learnt vocabulary through the website.

Student 1:

"The website is well organized and all you think about, you can find it here. You can add new words, new definitions, do some quizzes and more."

Student 2:

"Sharing new ideas with other friends and managing our own Leitner Box could be interesting."

Data from Table 3 also supports that the students' vocabulary learning process in this website includes adding new words and definitions, doing the quizzes and sharing information with each other. As table 4 shows 231 times of students visited their own Leitner Box; 295 times of students checked the new words in the word list; 116 times of students do the online quizzes; 82 times of students create new definitions; and at the same time, they learn from other learners via online. 121 times of students visit the forum; 70 times of students read the contents shared by others.

According to information collected from the questionnaire and interviews, it is not difficult to get a general idea on how they use this website for their English vocabulary study. It shows that students think they need to review the new words at the proper

time in order for them to eventually master the new words. They also shared the new words, contents and videos with each other. In order to test themselves, they took the online quizzes.

Mcgraw, Yoshimoto, and Seneff [28] discussed the problem of customizability of the expensive commercial software packages; they mentioned that flash cards are easily customizable. For this point, the web-based Leitner Box proved it again. In web-based Leitner Box, learners have many choices of learning. They can choose which word to learn, how many words to learn in a day and when to review the words etc. This means learners have all the freedom to manage their own Leitner Box. It is tailored to an individual's learning needs, which are highly customizable.

The findings of this research also have revealed that students showed strongly positive attitude towards web-based Leitner Box with the overall mean of 4.28 (Refer Table 4).  Various features provided in this website helped the students to learn and improve their English vocabulary. The automatic revision system of web-based Leitner Box is considered a better way to learn English vocabulary (Mean=4.31). Students agreed that Web-based Leitner Box makes the learning much easier and interesting (Mean=4.37). By using web-based Leitner Box, students agreed that their vocabulary has been improved (Mean=4.40). Once again it proved that Leitner Box is useful for English vocabulary learning. This is in line with [29] who stated that Leitner Box is a technique for learning with more and better effect. It should be created for learning English words or words of another language.

At the same time, students showed their preference to web-based Leitner Box compared to learning with paper and pen (Mean=4.03) and they also acclaimed that they would like to recommend this website to their friends (Mean=4.40). According to Sarica and Cavus, [30] learning English through web and using new trends in education in schools make students willing to learn the language.

Through comparison of the test results from class A and class B, the Mann-Whitney test has been conducted to investigate the difference between the post-test of these two groups showed at Table 5 and Table 6. The Asymptotic significance is 0.00 at alpha 0.05. Therefore it showed that there is significant difference between these two classes' post-test results. In another word, web-based Leitner Box is really helpful in English vocabulary study and it has a significant positive impact on English vocabulary learning.

In order to get better understanding about learners' opinion, online semi-structured interviews were also conducted. Students agreed that Leitner Box is very useful for English vocabulary learning, especially due to its arithmetic repetition system. Furthermore, the web-based Leitner Box is a very effective way to learn English vocabulary online at anytime and anywhere and it is an amazing learning

tool. Followings are some opinions from the respondents:

Student 3:
> "This method is based on human learning system and has it as a Leitner box over internet will be a very effective way to learn English online anytime, anywhere and of course free of charge. The Leitner box is based on very simple ways by repetitions between certain times until you fully learn words and will be very adorable especially for those who have not enough time to study English books."

Student 4:
> "Considering the fact that Leitner Box is the popular way to learning new vocabulary, it is amazing that we can use it online."

From the responses above, it is obvious that these students showed positive attitude toward the repetition system of Leitner Box; they think it makes their learning process easier and more interesting. For online learning part, most of them thought that it is very convenient because they can learn it at anytime and anywhere without carrying books with them.

This section also discusses students' perception on the functions of social network which mainly focuses on whether social network is helpful in aiding students to learn English. At the same time, some related questions were included, for example; whether social network makes the learning process more interesting and whether the usage of social network motivates students to learn more in collaborative learning environment.

By referring to data shown in Table 7, students learned new words from other learners through collaborative learning environment (Mean=4.09), and shared new words to other learners (Mean=4.17). This reflected that students actively joined this co-contracture collaborative learning environment. According to Shea, Li, and Pickett [31], active participation in a collaborative and well functioning community is the coherent mechanism through which knowledge is ultimately developed by the individual.

From Table 7, it also showed that students enjoyed a lot in this collaborative learning environment (Mean=4.29), and the social network functions motivate them to learn more from the website (Mean=4.31). Furthermore, all of the students thought that this website is good and claimed that they will recommend this website to their friends (Mean=4.54). According to Cho, Stefanone and Gay [26], social network plays important role for resource and knowledge exchanges in learning environment. Knowledge, in this case, is not a static object acquired by an atomic individual but is actively co-

constructed through ongoing social exchanges and collaborations among multiple learners embedded in social networks [32, 33].

Semi-structured interviews were also conducted in order to get the whole idea about learners' perception on social network functions in this collaborative learning environment. Since it is an online semi-structured interview, thus it is open to every user and they can write their comments freely. Students thought that collaborative learning is useful in which they can enjoy learning or attempt to learn vocabulary together with friends. They can actively interact by sharing new words, new comments, and new contents to enrich and improve their knowledge. These are the comments from students who are using this website:

Student 5:

"I think this website is good. It provides collaborative learning in which I can learn vocabulary together with my friends. And we actively interact by sharing new words that we learned from this website and take on asymmetry roles and I enjoy learning or attempt to learn something together with my friends."

Student 6:

"Collaborating always is useful. In such an environment, we can learn from our friends and share a lot of new comment and applicable words to enrich and improve our knowledge."

Meanwhile, students also agreed that collaborative learning environment makes their learning fun and enjoyable. They thought it is an interesting learning process by sharing information and knowing what is happening to other learners. Some examples of response are listed below:

Student 5:

"Adding new words and definitions is one of the interested parts. You will learn a lot from your friends' adding while you are updating your own words to let them learn."

Student 7:

"I love the history part. As we can see from this website, all activities that we did will leave a history. It's great because we can track what we have gone through before."

Based on the data collected from the semi-structured interviews, it showed that users agreed that web-based Leitner Box which enhanced with social network makes the learning process more interesting as they can interact with each other. In other words, social network functions changed the static individual learning actively into the co-

constructed collaboration [32]. It makes the learning environment more interesting and beneficial to each other and motivates students to visit the website more. It proved that social network could be a powerful tool to enhance learning process.

Overall, the summary of the findings are as follow:

1. Students claimed that they have problem in English vocabulary learning and they were not satisfied with their current way of learning.
2. Students found that the automatic revision system of web-based Leitner Box is very helpful for English vocabulary learning.
3. Students used web-based Leitner Box in learning vocabulary by frequently checking their Leitner Box and word list, participating in forum and quizzes and adding new words and definition.
4. Students enjoyed learning vocabulary by using web-based Leitner Box.
5. Web-based Leitner Box has significantly positive impact on English vocabulary learning.
6. Social network provide collaborative learning environment that helps students to learn English vocabulary by interacting with wider community.

There are some limitations of this research which somehow affected the flow of the research. However, they were manageable and proved not to be a hindrance to the results of the research. Although internet is only available in the class and library, students may use this website after class for their English vocabulary study. On the other hand, the wireless connection in the dormitory is not accessible sometimes which therefore limit the time that can be used for English vocabulary learning through this website.

In order to test students' progress for this specific period of research, the words of pre-test and post-test focused on the words input in this website. In the reality, the words in learners' web-based Leitner Box should be different according to their individual learning need.

## 5.0  CONCLUSION

From the research, it is found that web-based Leitner Box is helpful in students' vocabulary learning. The results from the tests also proved that by using web-based Leitner Box, students improved their vocabulary and it has significant positive impact on English vocabulary learning. Through social network functions, students learn more by interacting with other learners and sharing information from each other. Therefore social network is really helpful for online English vocabulary learning.

Based on the findings of this research, online Leitner box has potentials to improve students' vocabulary learning. The result of the study could be beneficial to English learner, especially for learners

learning English as a second language. Apart from improving the vocabulary acquisition and its technology-oriented medium of learning, the interesting features available in web-based Leitner Box could be helpful in making learning more enjoyable and fun.

Other than that, using web-based Leitner Box enhanced with social network in learning English vocabulary is one of the ways to integrate the social network technology in education. At the same time, it breaks the limitation of previous researches on online flashcards which were restricted to individual learning experience, in which information transmission just happen between learners and computer or website itself.

As Anderson and Nagy [11] said, teachers do not give much time for vocabulary learning in the foreign language classroom, nor do they give enough attention and guidance to students about how to learn English vocabulary. It is not only because learning English vocabulary is a tedious job and takes long time. It is also because there is no clearly-defined and efficient way that could be used for the classroom teaching and learning process. This study will provide teachers a web-based vocabulary learning application which can be used in the classroom teaching and learning. Plus, it can also introduce the students for outside-class self-study or group collaborative learning.

For future research, this research could be developed into bigger scale and covered wider subjects. There are some areas which could be continuously studied in the future and would bring some significant changes into the teaching and learning process. Some suggestions of future research which could be carried out are; a) the effects of using web-based Leitner Box in teaching and learning other languages and b) the effects of social network technology in English reading, writing or other skills

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